SUPPLEMENT.

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No. 2349.—VOL. L. LONDON, SATURDAY, AUGUST 28, 1880. PRICE (WITH THE JOURNAL) SIXPENCE. PER ANNUM, BY POST, £1 4s.

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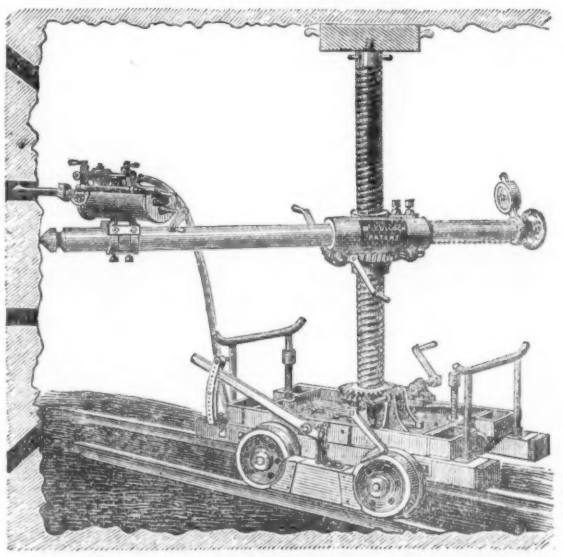

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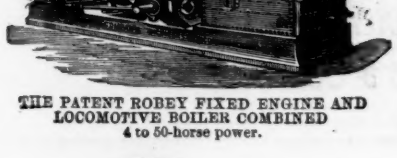

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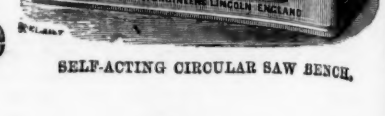

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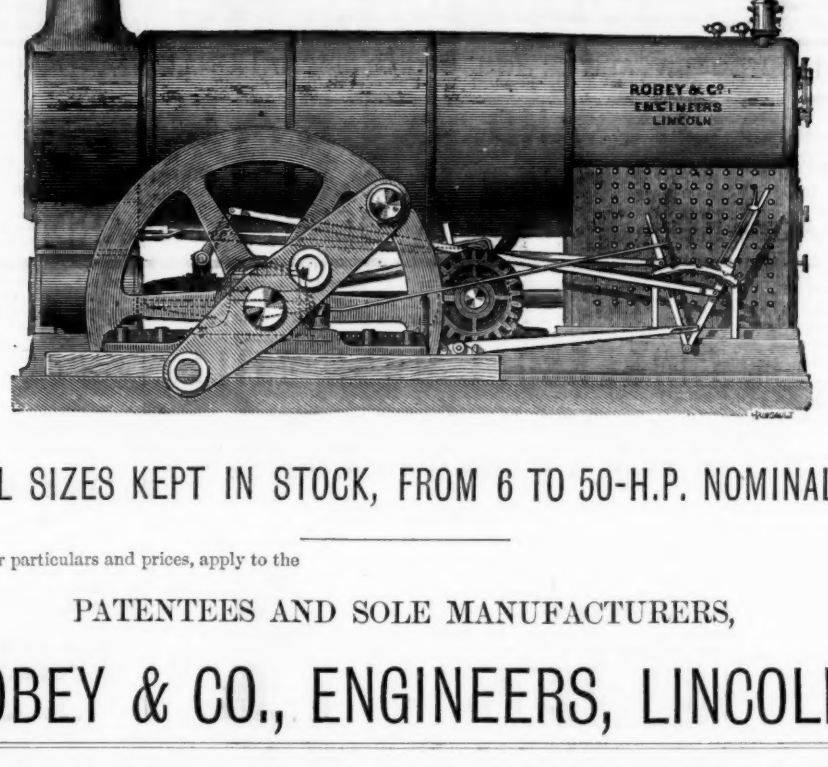

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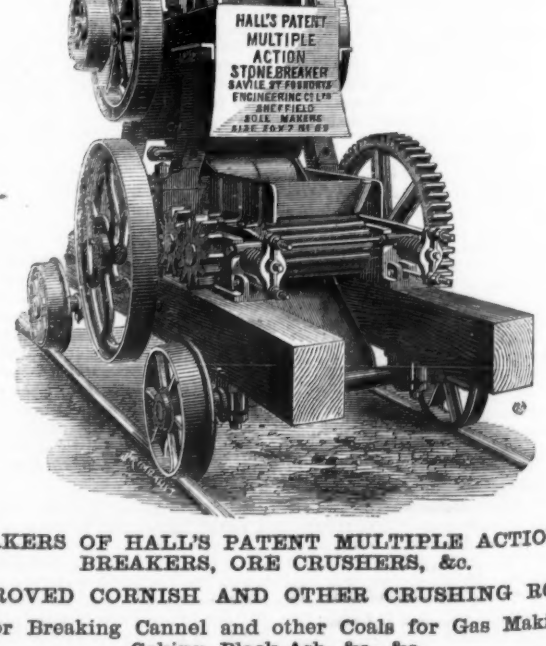

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THE PATENT OFFICE REPORT.

Sir,—Referring to the notice in the Times of the Patent Office report for the past year, it is instructive to compare the working of our office with that of our great manufacturing rival, the United States. Our office yields, as set forth in the report, an annual surplus of some 145,000*l.*, and this is borne by about 3400 patentees (1800 applicants not having proceeded), and by the Trade Marks and Designs Registry. In return for this large contrbution to the revenue of the country by inventors—a notoriously impecunious class—the office gives nothing like an approved property, leaving to the inventor the further expense of searching for novelty, and will grant patents for a similar invention to as many applicants as choose to pay the fees.

Turning to the United States, we find a surplus of about 31,000*l.*, borne by some 20,000 applicants (12,400 patents being granted).

The comparison thus teaches us that our rivals are acquiring inventions (certified by experienced experts to be novel and useful) at the rate of over 12,000 annually, while our own office seals during the same time only 3000 to 4000 patents, many of which are utterly valueless both as regards validity and utility. These figures speak strongly, and in face of them we cannot longer wonder at the rapid advance of our rivals and the comparative stagnatiou of our own industries. The paltry revenue we exact from the inventor is there realised to a much greater extent through increased production, and therefore revenue, of the country at large, and the mass pays imperceptibly what with ourselves appears an extortion from individuals.

The spirit in which the inventor is regarded in the United States is well evinced by the following extract from their Commissioner's report, who considers that "the constitutional provision which confers upon Congress power 'to promote the progress of science and useful arts by securing for limited periods to authors and inventors the exclusive right to their respective writings and discoveries' evidently imports, not that inventors are hateful monopolists to be taxed by the Government, but that they are public benefactors to be encouraged and rewarded." That this is the true theory, the patent system during the past century abundantly proves. This being the constitutional and manifestly the just theory of the relation of the inventors to the public, it is alike unconstitutional and unjust to maintain in its present condition the legislation affecting inventors by imposing upon them the special tax which amounted to the surplus named.

City Patent Office, Rood-lane, Aug. 23. Fell and Wilding.

THE PREVENTION OF COLLIERY EXPLOSIONS.

Sir,—The great danger of allowing accumulations of gas to take place has been proved by examples showing the sad results which, sooner or later, follow such unskilful practice. The first and most essential principle to give security in fiery mines is thorough ventilation extended to every place in the mine, and after this reliable safety-lamps, for should a sudden issue of gas occur—as they have occurred in certain districts—the ordinary ventilating arrangements are usually powerless in diluting such extraordinary evolutions of gas. Self-extinguishing lamps should be in such cases adopted, and where mechanical appliances are adopted for ventilation the machinery may be driven to its utmost capacity until the gradual decrease in the issue of gas is such that it is diluted to such a degree as to render the mixture non-explosive. It may be said that these outbursts seldom occur, but experience has shown that in mines subject to them they take place in an unexpected manner; therefore, every precaution is taken to deal with them in the most skilful manner, so as to avoid more serious consequences. What are called fire-damp indicators would not be necessary where a thorough ventilation was kept up. A mixture of 1 of gas to 5 of air explodes feebly (a mere flash); a mixture of 1 to 9 or 10 of air explodes most violently; and a mixture of 1 of gas to 15 is non-explosive. It would be possible to gauge by meter the issue of gas from the working places with sufficient accuracy so that the quantity evolved might be diluted properly; 16 times this quantity of air would render it non-explosive, but 200 of air to 1 of gas would furnish a margin sufficient to meet contingencies, such as large falls of roof, falls of goaf, &c., and would place the ventilation of a mine in its ordinary condition on a secure basis.

The mines in the Yorkshire coal field have been peculiarly liable to sudden outbursts of gas. Three explosions occurred during the year 1879, one resulting in the loss of 21 lives, and two others, with a loss of 5 lives each. The first-named occurred at Stanley Colliery, near Wakefield, on March 4, 1879, in the Silkstone seam, its depth being 475 yards from the surface. Two pits near together, 11 feet in diameter, are sunk to this seam, the depth being 475 yards. The ventilating power is a furnace placed 50 yards from the upcast, the furnace appears to have been fed with fresh air, the returns being brought to the bottom of the upcast, and passed the end of the furnace drift 20 yards higher up the pit. The workings on the west side were about 1700 yards in from the pit, and were bounded on the north side by an extensive goaf, and on the south by a large fault. The workings were thus limited in breadth, and were in course of being worked back towards the pits; 21 persons were employed on this side of the pit at the time of the explosion, all of whom were killed; about 30 more were employed on the east side of the pit, but these were not affected by the explosion, and, in fact, do not seem to have been aware that anything unusual had happened. The amount of air going up the upcast previous to the explosion was 75,250 cubic feet per minute; of this quantity about 53,000 passed into the west side of the pit. At No. 1 drift (a short distance in) this was reduced one-half, so that the quantity to ventilate the west workings was about 27,000 cubic feet per minute, which was considered sufficient for the requirements of the mine had other precautions been taken to ensure its safety. Unfortunately, five naked lights appear to have been used in these west workings at the time, and the explosion was attributed by the Inspector of Mines to an outflow of gas from the goaf at No. 43 north ending coming in contact with a naked light which was being used on the main intake, and about 200 yards from the extremity. The evidence was strong that this had been the source of the explosion in the coked dust, which was strewn thickly upon the props and sides. The main intake was most affected by this explosion; it was a complete wreck throughout, the stoppings and doors being thrown down towards the pit, indicating that the blast had gone in that direction. There does not in this case appear to have been any indication of an outburst of gas from the floor of the seam; the issue of gas was said to be from the goaf, and on this point the Inspector recommended that the use of open lights should be prohibited, seeing that the seam gives off gas, and a large area of goaf in close proximity exists on the north. Any fall or disturbance in the goaf would be attended with great risk were gas suddenly expelled from it. He also condemns the practice of permitting the workmen to go into the workings with the deputies, also the defective method of making the reports in the report book, and the singular laxity displayed in the management.

Another of the explosions in this district occurred at Fitzwilliam Main Colliery, near Pontefract, on Jan. 25 last year, causing the loss of five lives. The Shafton seam of coal was worked, its depth being 145 yards from the surface. It was worked on the longwall method; very little fire-damp had ever been observed here, and naked lights were used by the workmen. The effects of the explosion were limited in area, the supposition being that a fall of roof had taken place preceding the explosion, and liberated gas; this exploded at the first naked light. A seam of coal about 12 in. in thickness occurs about 7 yards above the Grafton seam; it is probable that the issue of gas originated from this seam, and that the roof had fallen up to it. Safety-lamps were adopted in the mine after this explosion. In both these explosions the cause seems to have been ascertained, both being the result of using naked lights in situations where the line of safety pointed to the use of lamps. Unfortunately the remedy was too late in being applied—not until a serious loss of life occurred, and in the first case great damage to the workings of the mine. Neither of these explosions were connected with shot-firing, though powder, it appears, was used at the Fitzwilliam Main Colliery. As naked lights have been abandoned, it is to be hoped that the precautionary measures adopted will exclude wholly the use of gunpowder where lamps are used. This will be more consistent with the line of safety, for if fire-damp was exploded at a small stationary light, it would be as much or more liable to explode at a larger flame, as in the case of a blown-out shot flying to a considerable distance from the seat of its explosion. M. E

MINE-CAGES AND MAN-ENGINES.

Sir,—In a recent reference to the report of Dr. C. Le Neve Foster, the Government Inspector of Mines for Cornwall, some mention was made of the use of cages and man-engines as a substitute for climbing, and it appeared to me that cages were proved to be much safer, although there was admittedly much room for improvement. Now, just such an improvement as is required appears to have been made by Mr. William Davies, of Merthyr Tydvil. He employs a lifting bottom, one end of which is hinged to the cage; to the other end two iron brackets are fixed, which project below the cage framing, so that the cage is firmly fixed in position the instant it stops, and it has the great advantage that the stuff could all be raised in the trams or in whatever else it is brought to the bottom of the shaft, instead of necessitating unloading and reloading, as is customary.

At the bottom of the shaft or pit there is also a stop lever or fang which as the cage sets supports the weighted lever under the cage, thereby releasing the front latches on the cage, the inclination of the lifting bottom realeasing all the remaining latches on the loose bottom, therefore the trams run off at once. To the above fang is attached by a connecting rod a vertical lever fixed between the rails of the tramway, so that when the hind wheels of empty trams or trucks have just cleared the front or latches nearest the hinged end of the cage, the front axle of the empty trams or trucks strike this lever, thereby drawing back the stop lever or fang, which at once releases the weighted lever under the cage, thereby sending out the front latches (nearest hinged end), which stops the oncoming full trams or trucks in their proper places on the cage until they are locked on, when the cage is eased off the bottom, and the lifting bottom gets its seating in the cage, when all the latches come out, which lock the tram wheels on the cage.—*Aug.* 24. H. J. B.

SHOT-FIRING, AND SIMULTANEOUS BLASTING.

Sir,—Apparently the most economical method of blasting is the most primitive. Unlike the improvements in most industries, in mining the important branch of blasting has increased in cost with each improvement made; and it is only when blasting is carried out in what may be called a "scientific" manner the full value of the latter is obtained. High explosives, though appreciated by miners, their heavy cost as compared with powder doubtless prevents their more general use, and for similar reasons electric blasting, with its strong recommendation for safety, will require some time ere it will be found in general work throughout an ordinary mine.

The principal methods used to convey fire to the charge in blasting are by means of straws filled with fine powder; squibs made of strips of paper about 8 in. long and 2 in. broad; safety fuse, and electricity. Firing with straws is not so prevalently in use, the filling of them being tedious, too; they require being carefuly selected, but they are used in certain districts in that branch of mining which involve, gas excepted, the greatest personal risk in shot-firing—*i.e.*, shaft sinking. That straws should continue to be used for firing off shots in shaft sinking in preference to safety fuse is anomalous, the chief reason being, perhaps, custom, supplemented by economy; yet it is practiced in some of the dry shallow sinkings of the northern coal field. The squib is made by doubling the strip of paper lengthwise, sprinkling a continuous lead of fine powder along the folded seam, again doubling and redoubling lengthwise till sufficiently rounded or piped for insertion. With straws or squibs, the powder being charged, a metallic needle about ¼ in. in diameter, outer end, and terminating in a point, is inserted down the side of the blast-hole and into the explosive. The hole being then tamped up, by withdrawing the needle a small but continuous way is open to the powder within, into which way the squib is inserted, and made firmly fast by pressing stiff clay around the projecting end, to which latter a slow match is applied.

It may seem unnecessary to explain what is an every day observance to many of your readers, but from a wide experience among working miners I may venture to suggest there are thousands of metalliferous miners who use safety-fuse, and are, therefore, wholly unacquainted with the use of the squib for blasting; conversely, those who use squibs are many of them unacquainted with safety-fuse. Even in some metalliferous mining district safety-fuse is practically out of use for blasting, as with the North of England lead miners and Cleveland ironstone miners, the practice being to use the needle.

Simultaneous blasting is not so prevalently employed as it might be thought its accumulative energy, and at times its economic value, would indicate. Its use is appreciated by those who have employed it, and it must be plain to the practical miner if the ground is strong two, three, or four holes placed suitably to the line of fracture, the simultaneous blasting of all must produce a beneficial result. As yet electricity is the means chiefly used to produce simultaneous blasting, but the time employed in examining the leading wires, connecting up, &c., together with the cost of wire and exploders, practically exclude its use in the working drifts and stopes of an ordinary mine, where two or three men only are working together, however advantageous it may be employed in undertakings of greater magnitude. The introduction of a fuse that is practically instantaneous, or similar to that discussed in the columns of the *Mining Journal* some months since, would doubtless be beneficial; still, fuses that are severely tamped must not unfrequently have an unequally retardative influence in the passage of fire down the fuse. Perhaps the needle might be employed, and merely insert the fuse after withdrawal of the former, thus giving to equal lengths of fuse equal freedom. For shaft sinking the advantages of electric blasting cannot be overstated. Foremost is its safety in application, after which may be considered its economic results. In the sinking of anthracite mines in Pennsylvania it has been in general use for many years. The sinking of the large shafts employed there (some 45 ft. long by 11½ ft. wide) afford unusual facilities for simultaneous blasting. The shafts being rectangular, the system employed may be thus described:—The shaft bottom or sump being flat a range of holes are drilled at a suitable angle; another range of holes are drilled opposite, the points of the two series of holes converging V fashion. Ranges of holes are also drilled in the benches standing towards the ends of the shaft. All being made ready for firing, usually once a shift and at meal time, each hole will have two wires protruding out. Usually the leading wires hang down, one on either side of the shaft. The leading wire on one side is connected with one of the protruding wires of a hole, the other to that of the next hole, thus connecting all the holes together, the last protruding wire being connected to the leading wire hanging down the opposite side of the shaft. The connections being thus complete the men ascend the shaft without risk or danger of premature explosion, and when the place of safety is reached connect the wires to the battery and fire the blast. C. R.

London, Aug. 25.

MINERAL RAILWAYS.

Sir,—We may now take it that capitalists are more disposed to look favourably on proposals for new enterprises. In fact, the Statist of July 17 states that there is no less a sum than 200,000,000*l.* sterling waiting in the London banks for investment, which it is difficult to find, and although the figure may be an exaggeration—we see no reason for thinking so—it is certain that the total sum available for new forms of enterprise must be very large. Bad as the times have been Englishmen made and saved in the five lean years a great deal of money, which was not, as it often is, flung away into preposterous speculation. No State plundered us much; no great amount of money was wasted on unreal discoveries, and there was a great deal of more or less stringent economy. Money was made and put away in very safe places, and now that prosperity is reviving, as the Revenue Returns begin to show, the state of affairs is very much in this wise. A great deal of money has been made, and a great deal more is making, and all the safe places for putting it away are getting choked. The "old stockings" and "tenpots" are all full. In other language, one cannot buy a decent security to pay above 4 per cent.

The Spectator, reviewing this, says:—"Cannot a stiff bit of work be found to employ this capital? We think that now is the time for the construction of narrow gauge mineral lines, and our opinion is backed by well-known City men, who say the investing public prefer as an investment English railways trading in minerals. This is evidently the opinion of all; as an instance we asked a few weeks ago for the promise of capital to cover the 5 per cent. deposit required by the Board of Trade on all new railway Bills presented to the House of Parliament. The reply was, after mentioning that it was for a mineral line, yes; anything up to 100,000*l.* Capitalists the same; 300,000*l.* was lately asked for mineral line, and was named to two City firms, and both offered to take the line and make it as a private investment for themselves. Therefore, to those who contemplate constructing new lines our advice is—strike whilst the iron is hot.—8, *Delahay-street, Westminster.* R. E. Wilson, C.E.

THE LEAD TRADE.

Sir,—During the last ten days our market has been very flat, and but little business passing, as smelters expecting an advance covered their wants to some extent. Since then rich Spanish lead has been offering more freely, and a few lots up to 400 tons sold yesterday at 16*l.* 10s. usual terms. To-day it is reported that there is a better feeling in London, and our market is firmer, but the buyers are holding back, expecting the lots now on the way, due in about 10 to 14 days, must be sold, and they hope to force prices down to 16*l.*

Newcastle-on-Tyne, Aug. 24. Stocks.

NOUVEAU MONDE MINING COMPANY.

Sir,—Whatever explanation may be given of the gérant or directors' reticence as to the raising of the further capital necessary for the purchase of the Nuncupai Mine, in Venezuela, there can be no doubt that it has exercised, and is still exercising, a depressing effect on the company's shares in the general market. Free communication between the governing body and its shareholders is the ordinary rule of procedure in English companies, and any departure from so wholesome a practice is not likely to render those who adopt it popular in this country, or to attract the capital of the English investing public. A large increase of capital, to the extent of 80,000*l.*, was, upwards of two months ago, asked from the shareholders of the Nouveau Monde Company, three or four days being allowed them to make up their minds on so important an appeal. No financial statement was exhibited, and shareholders were left helplessly to draw their own conclusions from very imperfect data. Whether the appeal was successful or not we have been left in blissful ignorance so far, to the best of my knowledge, as any public announcement is concerned.

The gérant is mute on the subject, so is the comité de surveillance, though at the meeting held in London, on June 9, something akin to a promise was given that the latter body would meet in Paris before this date, when the necessary accounts would be rendered, and forwarded to London for circulation among the shareholders. An authoritative statement that the further capital has been raised would give an impetus to the shares in the market; and if the reports from the mines are entitled to credit, as there is every good reason to believe they are, quotations would soon emerge from their present lifeless condition, and take their stand side by side with those of other enterprises of the same character and possessing the same general features in another part of the world, and whose development is awaited with anxious expectation.—*Beckenham, Aug.* 23. A Shareholder.

ENGLISH-AUSTRALIAN GOLD MINING COMPANY.

Sir,—The news received from the English-Australian Gold Mine this week is again most favourable. The present moderate profits will be largely increased soon after the new winding engine is at work, which was to be completed by the end of this month. The sinking of the shaft to another (520 ft.) level will also now be commenced. It must not be forgotten that the whole capital of the company is only 22,000*l.*, so that a large rate of dividend may be confidently looked for before very long. In comparison with the Indian companies this is a certain and safe profitable investment. A Shareholder.

Aug. 25.

RICHMOND MINE.

Sir,—Mr. Brereton's tabular statement, which appeared in the Journal of Aug. 21, placed this mine as the sixth and lowest in the scale, showing a return of 310,800*l.*, a dividend of 65,700*l.*, and a percentage of 22 or a working expense of 78 per cent. for the last year. I, with many of your readers, would have felt exceedingly obliged had your correspondent given the relative prices of six mines on the Stock Exchanges of London and San Francisco, to enable your readers, as well as shareholders of the Richmond Mine in particular, to judge of the confidence the public have placed in the stock of these six American mines. Perhaps one of your readers on the American side can favour your widely-read Journal with the above information, for which I am confident many of your English readers would be greatly obliged. A Richmond Shareholder.

COST-BOOK, AND LIMITED LIABILITY.

Sir,—Your correspondent is all wrong in his inferences and conclusions. The Cornish bankers are the greatest friends the Cornish mines have ever had, and had that not have been so the Camborne, Redruth, and Illogan districts now giving such large profits would ere this have been wrecks, and the populations ruined. Had these mines been worked with limited liability it is obvious that the bankers could not in justice to themselves have advanced money to help in the time of their great extremity about two years ago, and it is quite certain the public would not have done so, and the shareholders were powerless, as outsiders would hardly have taken the shares at a gift.

It was the Cost-Book System then which not only justified the bankers in saving the mines but saved a county almost from ruin so far as the mining population was concerned, and it moreover saved properties to shareholders who are now men of fortune—many of them because of the enormous wealth of their mines. It is not likely that these people will now go to Limited Liability, which has long ago been described as the "Fools Paradise" by its victims in Cornwall. More might be said about fully paid-up promotors' shares, &c., but this will, I dare say, be enough for your correspondent.

Yorkshire.

COST BOOK AND LIMITED LIABILITY.

Sir,—I should judge that "Mining Investor" had a lot of limited liability mines on hand which he found it impossible to push off. Probably he has some with only the fully paid-up shares taken, and with no inclination either on his own or on his friends' part to subscribe any working capital. It is clear that he has no shares in the leading Cost-book mines which he mentions, but that he wishes he had.

The Cost-book System is a perfect system so far as anything of the kind can be perfect. The only useful amendment which occurs to me is making the wilful keeping back of accounts a criminal act. The letter of your correspondent is clearly written for the purpose of getting good Cost-book mine shares in exchange for limited liability securities. He quotes one limited liability mine—Devon Great Consols; the fact of even that being limited would keep me out of it. But can he quote another limited liability mine in Devon or Cornwall which is prosperous? I mean by prosperous paying dividends. I doubt whether there is more than one not paying dividends which is likely to do so. It would be advisable for "Mining Investor" to reckon up the number of limited liability mines which have failed in Cornwall and Devon. Their name is legion, and the reason is plain. What applies to mining enterprise does not apply to banks and other limited liability companies. Those who have to raise capital for the working of mines know how difficult it is to do so under the Limited Liability Act. When first a limited liability company is formed all goes merrily enough, but the inevitable more capital cry is certain to be raised, and the disappointed shareholders do not respond. The agonised directors, who often do not hold more than one share each, and are commonly known as "guinea pigs," propose preference shares, but they get no response. Then they urge debentures, but the shareholders will not have it, and then comes

the total collapse, and either the quiet wind-up or the more effective closing of affairs by the Stannaries Court.

But what of the Cost-book? I could name mines on the registers of which it is as safe to be as on the books of the Bank of England. The accounts are brought closely up, and whether the shareholder attends the meetings or not he knows his own position as well as possible. He can close his liability at any moment by relinquishing his shares or by selling them, and the idea of the two years after date is an idea only. My strong advice to your readers would be the very opposite to that of your correspondent. We will, in reply to this, quote limited liability mines in Wales, but let us have a complete list of them, and let us know how many have been started within the last three years, how many of them exist now, and how many out of the whole number have ever divided 500*l.* each in profits, and what amount has been totally lost.

No doubt we are all very much indebted to your correspondent for his advice, but we who hold in the first-class Cornish mines are quite content with the Cost-book System. A COST-BOOK INVESTOR.

London, Aug. 26.

GOLD IN WALES—No. XXIX.

SIR,—A leading Conservative organ last week ground out a dismal dirge anent a recent shipment of gold to New York, in payment for enormous exports of food-stuffs from the United States. City circles, it is said, are in a "flutter" about it, lest Europe should be soon drained of the precious metals, and particularly gold. The innocent little turtle doves of Capel-court are said to have "cooed at right angles" about the frightful exodus of sovereigns into a Republic. It seems to be forgotten that Europe furnishes very little indeed of the metals from her own rocks, although it is generally admitted that they are capable of yielding very much more than they do yield or have yielded.

There happen to be three leading European banks which, contrary to telegraphic reports in general, tell a reliable tale. Let us see what they hold in their coffers. There is the dear venerable "Old Lady of Threadneedle-street," who holds nearly thirty millions; then we have the Bank of Germany, holding nearly as much as the Bank of England; and the Bank of France, holding fifty millions of gold, and thirty millions of silver. Total, 140 millions sterling. All things considered a very nice little round sum to talk about, even in "City circles." But many people have never thought, and some purposely forget, that nearly all this is surplus cash above and beyond the current wants of commerce, barring a few insignificant fluctuations. In fact, these are only money tokens not wanted by their respective owners. The puny or designing scare-mongers who mourned, or affected to mourn, over the cash thus "drawn for the States" might if they liked be ashamed in the face of the fact that the sum thus withdrawn did not exceed the aggregate value of the pocket-money of Great Britain's school-boys," and the "loose cash" of "movers about on pleasure bent." Why a scare should be started out of such rubbish it is hard to tell. Yet so it was, and somebody profited, which others did not.

A Manchester merchant once told me that he had lost 10,000*l.* in a given year. On being reminded that he had gained 50,000*l.* that very year—"Yes," said he, "that is so—that's true enough; but I made 60,000*l.* the year before, therefore I must have lost 10,000*l.*, you see."

Some of the panic-mongers argue just like my calculating old friend. They say—"The world's supply of gold appears to be running short. Certainly the produce of the existing mines is year by year steadily falling off." This may be all very true so far as it goes, but it does not go far enough.

From 1852 to 1860 the world's gold yield averaged 36 millions a year or thereabouts; but the last two or three years show an average of only about 20 millions a year. It is put, therefore, that we are losing just 16 millions a year. Can we lose what we never had? Or is the Manchester manufacturer's mode of calculation correct?

In the earlier periods of gold finding is some places gold was as plentiful as blackberries; in many places a good deal bigger—and it was got without much loss of time, money, or labour. As the nugget and pepita stuff decreased in size the weight yield, of course, diminished—and the labour to a great extent diminished also. As the case stands at present, unless the "Celestials" in thousands be allowed to work in other people's gold fields, the already partially-wrought places are not likely to yield much more of the desiderated treasure. But there are unwrought gold rocks in abundance even now. India is coming boldly to the front, and Venezuela. India with her rice-feeding and down-trodden natives may accomplish much. Venezuela with her untouched alluvial, though more sparsely populated, may equal India in her total yield, and from all accounts is the most likely to answer all reasonable expectations, and, moreover, it is within easiest reach of this country. From what we hear from private and reliable sources Venezuela seems destined to rival California and Australia in nearly their best days.

Touching the falling off in the world's gold yield my belief is that in a few years there will be a far greater annual yield than has gone before—not so much from quartz reefs, deep mining, and alluvial washings (although these may be much greater than at present), but from the auro-pyritous "tailings" and debris that lay about in millions of disregarded heaps all over the gold-producing regions of the world.

It seems strange that at the St. John del Rey Mines a loss of 65,000*l.* a year in the pyritous matter has to be submitted to. For one, I think that four-fifths of this heavy loss is preventible. I have come to this mental conclusion after a very long series of experimental trials. In order to prove it or otherwise, apart altogether from share speculations, &c., I am about to commence a commercial trial upon 1000 tons of mixed sulphides, "tailings," &c., up the Mawddach Valley of Merioneth, by means of improved adaptations of some of the older methods of operation and some newly-discovered methods of my own, which are designed to deal with auriferous and argentiferous minerals with a directness that has not hitherto been attempted, and, at the same time, assuring me against nearly all possible peculation. Obviously if I succeed even approximately in this object the gold yield of the world might very soon make up its back reckoning, and that verily from material upon which the heaviest labour cost has been already expended, and which is at present considered worthless, inasmuch as there is no remunerative market for it, and nobody appears to be dealing with it profitably.

As I am wholly uncontrolled in this important commercial experiment I may frankly say there will not be any wrongly biased reports published thereupon by me. Very likely I may keep a secret or two to myself; but, if you will allow me, I shall from time to time, as usual, keep "pegging away" at "Gold in Wales" whether some folks like it or not. Somebody is not everybody.

One thing, however, I may be allowed to say in concluding my letter—I am not interested to the extent of a single farthing in any joint stock company whatever, and am not, therefore, "puffing" anything in which I have "shares to sell;" but I am intensely interested in the results of the forthcoming sulphide experiment, for I know of several Welsh havilahs "where there is gold," and I confess to what may, I think, be called a pardonable desire to get some of it to do what I like with.—*London, Aug.* 23. T. A. READWIN, F.G.S.

THE CAMBRIAN MINING COMPANY.

SIR,—I have read in last week's Journal the report of the meeting of this company, by which it appears they have not met with the success they anticipated. I have no interest in the present company, nor am I acquainted with anyone connected with it; but it may interest shareholders to know something of the western part of the mine, to which during the last working I was a sort of consulting engineer on many occasions—and I may add I am a Civil and Mining Engineer of some experience. Beginning at the extreme west, there is a shaft called Shaft Goch, which is sunk 30 fms.; on the west of this a winze had previously been sunk from the 20, called Joachim's winze. This laid open a course of solid steel-grained lead ore, upwards of 4 ft. in thickness, and from this winze upwards of 8000*l.* worth of lead was sold in twelve months—about 550 tons of lead. Shaft Goch (Red shaft) was brought down with a view of getting under this, and unwatering the mine, it being impossible to work pumps on the winze referred to. At the same time a shaft to the east was sunk in a soft ground, and ran together; was again cleared and made good, and I fancy has again run together. Owing to the heavy outlay on this and other (private) reasons the mine was sold.

Shaft Goch is a splendid shaft, in solid ground, fitted with pumps and winding tackle complete, to be worked by an engine close to the shaft. By carrying this down to 50 fathoms I have not any doubt but that a splendid course of ore will be laid open. Further to the east of all these workings is the Blue shaft, intended to cut the lode at a depth of 100 fathoms. I would strongly recommend the present company if they have capital to develope this part of their property by sinking the Shaft Goch, or if they have not to sell it off to a new company, there being an ample extent of sett for two or even more mines. In either event it is no mere matter of chance as to the result.—*Aug.* 25. ESGAIR-HIR.

NORTH TRESKERBY MINE.

SIR,—I have the pleasure of informing you that Captain Richard Pryor, of Redruth, the former manager of North Treskerby Mine, has just purchased the lease thereof, and all the machinery and effects thereon, for a sum not exceeding 3000*l.*, but somewhat under that amount. The machinery consists of an 80-inch pumping-engine, another pumping-engine of about 50 inches, and a winding-engine. He was very fortunate in securing the property, as there were other competitors for it. He has made a good bargain. I understand it is for a respectable company in London, who are about to re-work it under Captain Pryor's management. You are aware that the late company's affairs are being wound-up in the Stannary Court. If the company had taken Capt. Pryor's advice as to the mode of operation there would not be such a debt as now stands against them, and which will involve a "call" on the shareholders. The "winding-up" process was the result of the failure of the principal shareholder in London. North Treskerby was not stopped for poverty, but because the engine, which is situate in the western part of the sett, was not sufficient to keep out the water from the bottom level, which is very very rich in copper ore. The 80-in. engine, on the eastern, or central part of the sett, is on a shaft which will take the lode about 50 fms. deeper. I believe it is Capt. Pryor's intention to attach a flat-rod to that engine and drain Tresidder's shaft, from which speedy connection can be formed with the rich mass of ore now under water.

There are numerous tin lodes in the sett which will pay well for development. I suppose that dividends will be resumed in a few months, for it was a dividend mine a few years ago.

R. SYMONS.

WHEAL UNY AND ITS MANAGEMENT.

SIR,—A meeting of the adventurers is convened for Monday next on the mine. I hope all those who are interested will, if possible, attend (as there are a large number of shares held in Cornwall), and invite discussion as to the present efficiency of management. I, for one, have but little confidence in it, and am inclined to believe that if a change were effected in this department it might confer a mutual benefit on each shareholder. A SHAREHOLDER.

Liskeard, Aug. 26.

PHŒNIX AND WEST PHŒNIX UNITED MINES.

SIR,—As another disappointed shareholder in the above mines allow me to express my deep sympathy with "A Disappointed Holder" in last week's Journal, and my annoyance at the mismanagement going on at the mines. I too have bought shares at 5¼ on the strength of representations made to me, thinking the mine was under respectable management, and certainly if the agent's reports in the *Mining Journal* are at all reliable (and I have no reason to doubt their accuracy) the mine is a first-class one, and the shares cheap at the price named.

Circumstances over which I have no control prevent me from taking action in the matter, but I hereby warn my fellow-shareholders that if they quietly allow things to proceed as at present their fine property may in a very short time change hands at about one-fourth its value. What may I ask do these pursers, managers, &c., mean by keeping from their shareholders all honest record of their proceedings at their meetings, only that apparently they are afraid to let in the light? Why not send a full report of their proceedings, like other mines, to the Journal, and let their shareholders know something of what has taken place, and who has attended? What explanation I wonder can they give as to why they ventured to pay a dividend last March, or how they got the money to do so, whilst they could not possibly do it from the earnings of the mine and while they were heavily in debt? Why not apply the money to pay off at least some portion of the debt on the mine, or at all events like honest men square up their working expenses and not leave three or four months in arrear? There was possibly an object in view in doing all this, and I do not hesitate to say that such a proceeding was most improper.

Again, what can be more objectionable than repeatedly taking credit for large quantities of ore said to be prepared, but not sold? In March account credit is taken for 3000*l.* in this way, and I have no doubt that the deficit on this estimated sum has told heavily on the present August account, in which they again take credit for 1000*l.* for ores prepared, but not sold, and who knows there are any such ores in existence? Is it possible that any body of shareholders can have the least certainty of how the real affairs of the mine stand, or of what their liabilities are?

It appears to me that remonstrance would be quite useless; the only remedy for such a case lies with the body of shareholders themselves, and it is simply this—dismiss these offending officials, appoint an independent committee of management, with an energetic chairman at its head, no matter what may be the cost, and under such management Phœnix United, like some other concerns well known, would some become one of the leading mines in Cornwall Leave things to go on as at present, it only requires time, and not a very long time, to extinguish the already attenuated interests of the present proprietory.—*London, Aug.* 23. INDIGNANT SHAREHOLDER.

STARTING THE MACHINERY AT SOUTH CAMBRIAN MINE, CARDIGANSHIRE.

SIR,—It affords me much pleasure in being enabled to give you the following information respecting this property:—Two years ago last June operations were commenced by the present company, who purchased it from a local party, and who from that date spared no expense that was necessary to speedily develope the mine, and they continued the driving of their deep adit eastward, where the ground rises rapidly, and succeeded in opening out a rich course of blende, lead, and copper ores for nearly 100 fms. long, the vein on an average being 18 ft. wide. This ore ground was well ventilated by the sinking of an engine-shaft from surface to the deep adit level, and this engine-shaft will not only ventilate the workings, but being sunk in the midst of the course of ore so far as it has yet been developed, is admirably adapted for opening out the mine in depth under the deep adit level. The managing director and principal shareholder, seeing a vast quantity of ore ground thus laid open, wisely determined to lose no time in the erection of a powerful field of machinery, not only to crush and dress the ores, but also of sufficient power to sink the mine 60 fms. under adit. This consists of a splendid and new water-wheel, 40 ft. diameter and 3 ft. breast, 30 in. diameter rolls, crushing mill, self-acting jigging machinery, and slime round buddles of different diameters, all new and complete, and these were successfully started to work in my presence on Aug. 17, being driven by a powerful stream of water from the Camdwr Bach brook and other streams flowing through the grant, which is a most extensive one. The whole were put in motion without a single hitch or mishap of any sort, and I may say, without being accused of exaggeration, I have never seen anything to equal them.

During the past few days a splendid discovery has been made in the stopes over the deep adit level, in taking down the lode to its full width, where they are now getting some of the richest and purest silver-lead ore it has been my lot to witness for some time past. From this date regular returns and profits may be relied on; and from the character and size of the lode, the gossan, and every other indication, this should make certainly as rich a mine as any in the county. A nice lot of buildings, comprising office, carpenter's shop, smith's shop, stabling, and every other requisite, is built in one compact lot near the dressing flooring, to which place the ores are brought from the different bargains, as broken in the mine, by a pony tramway, and delivered into the slide, and from thence into the crusher for manipulation.

I may say the whole of these arrangements have been carried forward during the personal superintendence of the managing director, Mr. Stringer, of Manchester, but under the able management of his agent, Captain Andrew Williams, to whom the thanks of every shareholder are due; and as one of them, they will accept from me, at least, through your most widely spread columns, my acknowledgment of what I consider I could not fairly withhold from expressing; and in conclusion, I trust and believe that a long, lasting, and very successful career is before them.

Aberystwith, Aug. 26. ABSALOM FRANCIS.

MINING IN CARDIGANSHIRE.

SIR,—The wave of returning prosperity and activity, as shown by the astonishing Statistics of the Board of Trade, is telling upon mining interests equally with others, and no well-wisher to such an important industry can but be gratified at the progress being made in one or two of the most prolific districts of this country and with the outlook generally: the market value of our dividend mines and of those progressive ones is already greatly enhanced, and confidence in new undertakings gains ground steadily. One of the properties, now named West Lisburne, included in some remarks you favoured me by inserting a few months since, has been taken in hand by a party of talent and energy, and I am pleased to hear that applications for shares are being made from all quarters and on a liberal scale by men of discernment, some of whom are making it a matter of business to personally investigate the merits of the property whilst they are enjoying their weeks of leisure in this beautiful locality. The boldness of organizing the company without cash payments to the owners no doubt has acted favourably with investors, but it is well known that with the large sections of ore laid open above the 46 fm. level and continuous below the mine has been sought after repeatedly years ago without success, owing to the absence of a safe grant of mining rights. Another attraction has been the continuous success of such neighbouring properties as the Lisburne, Grogwinion, and Frongoch Mines; and in West Lisburne similar conditions of veins and strata are to be seen, and moreover the large amount of work done by former proprietors in developing the mine for the advantage of the present company is of the utmost value and not easily estimated, taking time also into account.

Aberystwith, Aug. 26. P.J.

MINING IN LLANARMON.

SIR,—I find that some of the suggestions I have thrown out from time to time are in a fair way of being realised. To accomplish the ideas no one has worked more assiduously than "our mutual friend" Capt. Ede in laying before your readers evidence on the Llanarmon district as a field for legitimate lead mining, and when such evidence of the value of the mineral and metallic deposits can be brought forward from time to time for the consideration of those interested in lead mining as a business I think gentlemen like Capt. Ede should be encouraged in every way. Nothing that I know of can be more encouraging to legitimate mining on good grounds than the evidence of men who have spent their lives in the practice and theory of the work they are engaged in. Opinions expressed by such men, and facts gleaned by them and put forward in clear unmistakable language, in all cases ought to be well weighed, and I have reason for believing that the facts given by Capt. Ede in the letters he has lately given in your columns are rather under than overstated. I know his opinions of this district as a lead mine district are shared in by other mining engineers, and I am prepared with evidence to follow that which I have now the pleasure of giving from the pen of Capt. Ede upon this particular portion of the lead bearing district of Llanarmon. The following report was given by Capt. J. A. Ede on the Lady Ann Lead Mines, as you will see by the date, last year. It is pleasing to note here that matters have progressed so well at these mines from the time of commencement of operations that a company is now formed, with limited liability, in 1*l.* shares, to work it vigorously, and as the accompanying report, and others to follow, will show, with every prospect of success. I may here mention, also, that Capt. J. A. Ede has no interest in this property whatever, neither as owner nor promoter, his report being quite independent of any influences further than those attaching to his profession as a mining engineer and the promotion of the truth and true and honest mining. Capt. Ede's report is as follows:—

Lady Ann Mines, Nant, Nov. 24.

In compliance with your request I beg to forward you my report on the above property. Topographically: It is situated five miles south-west from the town of Mold, in the immediate vicinity of the Nant, Pant-y-Gwlanod, Westminster, Belgrave, and Maes-y-Safn Mines, and within a few minutes walk of the turnpike road from Llanarmon to Mold. Geologically: Its situation is favourable, being in the bearing measures of the mountain limestone. In my opinion most of the ore discovered in the carboniferous formation has been found in equivalent horizons, which are affected by similar causes subject to different degrees of intensity. If this is the case it is very important that the proper horizon be selected for the centre of operations, in fact, it becomes essential to a productive mine. In proof of this I find that the great courses of ore at Nant, Belgrave, Pant-Ddu, Westminster, Maes-y-Safn, and Mold Mines have been found under the same lodes, but the quantity of ore differed in proportion to their connection with some consistent law of nature; therefore I say it is important and essential in order to secure a good mine for it to be situated in equivalent strata with some other rich mine. I am prepared to say, after a long residence in this country, that your geological position is all that can be desired; and if I can prove that the lodes traversing your property are of that character as in all cases to produce ore, when intersecting bearing ground, anything further will be superfluous to the point at issue. I had intended to dwell upon the deposition of ores in these lodes, but this also might raise a discussion without attaining any proportional practical result, as my conclusions would be the same with respect to your property as those drawn from the summary of other practical gentlemen of opposite views. There are at least four well known east and west lodes traversing the sett that have been worked in the eastern bearing measures with the following results:—The Nant lode, 50 fathoms east, returns one million sterling worth of lead ore; Ede's vein, a new lode, profitably worked 50 fathoms east at Bryn-y-Mwyn Mine, worth near the surface from 1 to 2 tons of ore to the fathom; Pant-y-Gwlanod, a very rich lode, from which a course of ore was worked from the surface to a considerable depth, during which time returns were made of from 60 to 70 tons per month; and Francis vein, the discovery of which must be credited to your indefatigable exertions in order to secure the best point for your permanent workings. All these lodes are possessed with sufficient scope and capacity, and in every instance have been prolifically rich in the different bearing measures of the district. It may be interesting to you to know that the runs of ore in this district have been noted for their permanency and continuity. The Westminster run of ore extended 300 fms.; the Nant 400 fms.; and the Pant-y-Gwlanod 300 fms. Judging from the configuration of the surface, the ore discovered in the lodes, and other attending favourable indications, it is highly probable that a run of ore starts some distance west of your present point of operations. I should mention that there are two or three other lodes in the sett from which ore has been extracted, and the probabilities are that you will meet with more. Point of operation is upon Francis vein (Nov. 28): A shaft has been sunk nearly 25 yards deep from surface (it is now 31 yards deep, with a level to the east driven 7 yards) on a promising vein which has yielded small quantities of lead for the distance sunk, and I anticipate you will cut a body of ore when you intersect the great Nant lode. The miners who worked at the Nant inform me that they were so sanguine of the western ground being rich on the lode that they offered to work the mine free of all charges if the machinery would be allowed to remain. In conclusion, I must say that taking everything into consideration—*i.e.*, its position, character of the rocks, number of lodes, their size and constituents, with the virgin state of the sett throughout—that you are in possession of a *bona fide* undertaking well worthy an energetic trial.—J. A. EDE.

Dec. 5.

DEAR SIR,—I called at the mine this morning, and was pleased to notice the unmistakeable evidence around of the metalliferous character of Francis vein, galena and carbonate of lime predominating. I await with some anxiety the intersection with the Nant lode. I strenuously advocate your sinking on the new lode discovered at Bryn-y-Mwyn. There are other points which can be recommended on most reliable basis which undoubtedly you purpose turning to when you have made the anticipated discovery at Francis shaft. JOSEPH A. EDE.

Lady Ann Mine, Aug. 23.

It is improving a little at our work. We have some lead in the roof 9 in. long and 1 in. wide. We are going on very well with the level now, as we have not much water (surface) with us. We are expecting every day to have good lead and plenty of it. N. JONES.

Sir, the latter report is just to hand this morning from one of the workmen, and is very cheering to those who know all about this work. I must now, however, conclude, and bespeak, if you please, some of your space in a future number.—*Aug.* 24. ENQUIRER.

[For remainder of Original Correspondence see this day's Journal.]

IRON-MAKING IN AMERICA.—The Franklin (*N.J.*) furnace of the Lackawanna Iron and Coal Company was blown out on July 4th, on account of the condition of the iron trade It was in blast just fifty-

two weeks, and made during that time 22,741 tons 7 cwts. of pig, being a weekly average of 437 tons 6 cwts. 2 qrs. 19 lbs., which is the second best yearly average yet made by an anthracite furnace, being exceeded only by the record of No. 1 furnace at Scranton—of 462 tons weekly for one year. The iron company made in all during the year ending June 30, 97,031 tons 19 cwts. of pig-iron. Most of the time five furnaces were in blast, but part of the time only four. The above is claimed as being the largest amount of pig-iron ever yet produced by any American company with an equal number of furnaces.
— *Scranton Republican.*

NEW COAL HARBOUR FOR CANADA.

PORT HIAWATHA, NOVA SCOTIA.

It is not doubted by anyone connected with Canada that Nova Scotia, from its enormous wealth in coal, is destined to become the most prominent province in the Dominion, and to secure the full benefit of these natural advantages it is essential that every possible facility should be afforded for shipping the coal at all seasons, and at the minimum price. That Halifax, the great Nova Scotian port, would also be immensely benefited by being able to guarantee all the year round an unlimited supply of coal direct from the pits, and not surcharged by the cost of storage, is equally beyond question, and it certainly appears that Port Hiawatha, in Cape Breton county, to which attention is now being directed, would afford the utmost possible facilities not only for the direct shipment of coal to St. John's, Newfoundland, and England, and at the same time enable Nova Scotian coal to be offered in Halifax all the year round at prices which would ensure a ready and remunerative market. To permit of the situation being thoroughly understood, it will suffice to state that a line, drawn less than a point north of north-east from about the centre of Scatari Island, which is just outside Gulf St. Lawrence, will leave all the Nova Scotian coal field on the St. Lawrence side, not a single workable coal deposit being found on the Halifax side of such imaginary line. Hence all shipments, except a few thousand tons sent from Cow Bay, are made from Glace Bay, Lingan Bay, and Sydney Harbour, all of which are hermetically closed by ice as soon as winter sets in.

Port Hiawatha lies within the coal field, but beyond the ice region, so that shipments could be made from it at all seasons without interruption, and at a comparatively trifling cost for railway extension every colliery in the district could be put in direct communication with it, and thus open a constant market for the colliery owners, and increase the commercial prosperity of the whole province. The property of which Port Hiawatha is to be formed is a large, deep, salt water lake belonging to Mr. Pryse Protheroe, F.R.G.S., and which almost connects the head of Cow Bay with Mira Bay. Operations have already been commenced for converting the lake into a coal dock, with wharves, piers, &c., under the name of Port Hiawatha, as an outlet to an extensive coal field, which, stretching from its shores, comprises an area of 150 square miles in extent. Certain adjacent collieries now shipping on the open coast, and others awaiting a shipping place, must avail themselves of this harbour as being the most profitable and convenient, and the coal trade generally will be benefited by it, as at present the whole coal exportation is totally stopped during four months in the year owing to the drift ice from the North, which closes all other shipping places during that time, while this harbour, being on the South Coast, is free from ice, and will, when completed, enable the collieries to be in full work all the year round.

The importance of the new harbour both to the province and to shippers and traders across the Atlantic is fully recognised, some of the best authorities upon the subject having expressed highly favourable opinions. For example, the Chief Surveyor, and Deputy Commissioner of Crown Lands, Nova Scotia, states that its position on the northern shore of Mira Bay renders it particularly favourable for shipping; and an esteemed correspondent of the *Mining Journal*, Mr. P. S. Hamilton, late Chief Commissioner of Mines for Nova Scotia, in referring to the coal field for which Port Hiawatha will be especially valuable, says that "all of the numerous mines situated between these points (Sydney and Louisburgh), although immediately upon or near to the coast, are subject to the serious disadvantage of having no good natural harbour nearer than one or the other of the two just named, consequently great loss of property has already occurred from the necessity of shipping coal in exposed positions." The lake is midway between the two points referred to, the three forming nearly an equilateral triangle. It is the general opinion of Nova Scotian shipmasters and owners that the lake will make as fine a harbour as there is in the maritime provinces; and it is stated in a document, signed by a number of gentlemen, Justices of the Peace, Government officers, merchants, and others, speaking of coal mines distant from the Lake from a quarter of a mile to eight miles, "that they have been unable to work for want of a suitable shipping place." And again, alluding to the coal trade and the lake, "there is not the least doubt but that all vessels seeking coal freights from either the United States or the maritime provinces would at all times enter Mira Bay in preference to going north—that is, if they can get freight there."

For the purposes of shipping coal Port Hiawatha will be without a rival so far as export trade is concerned, and as it is proposed to work an extensive coal area held under the Crown at a nominal royalty of about 5d. per ton on the screened coal sold perpetually renewable until 1946, in connection with it, the supply of fuel will be at all times reliable. From the value and extent of the field, however, there need be no doubt that the wharves will always be well occupied for the entire coal field is capable of development to an almost unlimited extent. Thus, with reference to it, Mr. C. Robb, C.E., in the report of the Canadian Government Geological Survey of Great Britain, states "that such natural advantages, combined with its highly favourable position, point to this district as probably the most important in the Dominion for the supply of fuel to the numerous steamers navigating the Atlantic." And again, "the aggregate thickness of coal in workable seams is from 40 to 50 ft.; the seams vary from 3 to 9 ft. in thickness; they generally dip at a very low angle, and appear to be very little affected by faults or disturbances." And again, speaking of the coal, much of it will compare very favourably with the best English coal. There are about 200 water lots (spaces for building private wharves, &c.) of 50 ft. frontage, which, if sold at the Government fee of 9*l.* each, would amount to 1800*l.*, but which in neighbouring harbours are resold by private individuals for from 100*l.* to 250*l.* each when favourably situated. But the great source of profit to the proprietors would, of course, be the harbour dues, and the arrangements with regard to these are all that could be wished.

The lake being in all respects private property, the proprietors have the right of monopolising the shipment, trimming, and weighing of all the coal that passes over their wharves, and also the ballasting of vessels in the harbour. This is necessary, that dispatch may be commanded to the credit of the harbour as a brisk port, which is a great inducement to colliers to load here. But although virtually freehold and private property when open, the lake becomes a work of public interest, and the Government assumes the right of appointing the tariff for harbour dues and wharfage. These charges have already been fixed for this harbour by the Government, and are the same as those in other artificial harbours, and, of course, belong to the proprietors of the harbour. As there are many mines in the locality besides that connected with the harbour, proprietors requiring a shipping place, the coal trade of the harbour should increase proportionately. Thus the harbour, as a freehold and an outlet to a young and increasing staple trade, without considering ordinary and other trade that will be mentioned hereafter, will represent a property requiring comparatively little expense to uphold, after the first outlay, with the right to evermore collect dues, and which dues, upon the natural increase of trade accruing to a large harbour in such an important position, should soon assume a very respectable magnitude if judged by the growth of other young trades and cities of the West.

From the admirable situation of the lake it could not fail to become an important harbour; it is on the nearest point of America to Europe, and the coal field in which it is is the only one on the open seaboard of the Western Atlantic. It is also the nearest point of land to the point of divergence of Transatlantic steamers from the great circle or nearest track, either Canada or the United States, from England. It has been urged that, with but little deviation from their course, these steamers could coal at this coal field, and thus carry much more cargo and less bunker coal both ways, provided there were a harbour to accommodate them in the right position. The coal, too, would be cheap for them. As an open harbour the lake would prove an economical and reliable coaling station for a British naval fleet. The French Navy on the North American station now use the coal of this coal field. The population is remarkable for its sobriety and freedom from crime, labour is cheap and abundant, and skilled miners are numerous—in fact, an unlimited supply of coal at less than 6s. per ton of screened, including interest on capital, insurance, agencies, and all contingencies; and there is no reason to doubt that with Port Hiawatha as the place of shipment, and with ordinary organisation, a good market for Nova Scotian coal could be created both on the channel coast of France and along the entire Mediterranean, at prices which would be highly advantageous to consumers, and amply remunerative to the Nova Scotian coalowners. The progress of the enterprise for developing Port Hiawatha will, therefore, be watched with much interest.

TECHNICAL IMPROVEMENTS IN MINING.

THE DUSSELDORF EXHIBITION.

After the brief review of the history and development of the coal mines in Rhineland and Westphalia, we propose next to glance at the technical improvements in mining, which were made during the last years, and which are, of course, of very varying nature. They showl all, however, a decided tendency to increase the rentability of coa mining generally, by the introduction of cheaper and more durable contrivances, and by augmenting the efficiency of the same in connection with the cost and output of the mines.

We thus easily recognise the efforts to get the work better and cheaper done by introducing improved tools and mechanical power, particularly rock-drills and coal-boring machines for certain purposes. The directors of the State mines of Saarbrücken exhibit the tools generally employed there for mining labour proper and for accidental uses, such as timbering and smithwork; they are tastefully arranged upon two large shields, which ornament the side walls of the Mining Department. Similar tools and instrumeuts are shown by some Westphalian collieries, by Rheinelbe and Alma, Hibernia and Shamrock, and others. Very fine assortments of tool-steel, and of tools made of it, such as picks, borers, hammers, particularly holing-picks with movable points, and carpenters' tools, are represented by the Siegen-Solingen Cast Steel Works, Söding and Halbach, and Remy, of Hagen; Hüppe, of Remscheid; Weiss, of Siegen; Peter Harkort and Son, and others. Very good smiths' tools are also exhibited by Weiss, of Siegen.

With regard to coal-boring machines, it is remarkable that coal-cutting machines proper, which, since many years, have largely occupied the minds of English mining engineers, have had frequently a trial at German coal mines, but that they were generally discarded again, because they could not compete with cheap and skilful labour which is still to be had in Rhineland and Westphalia. One particular species of hand coal-boring machines, however, has found much favour in fiery mines in Westphalia; it is intended for boring wide air-holes through the pillars of coal, between two levels, so as to allow the gases, which may accumulate in one level, to pass through them into the air-ways, and thus to be got rid of in the shortest possible manner. These air-holes are substitutes for the former overhead cutting, which had the same purpose, but were very often dangerous from the accumulation of explosive gases therein. The coal-boring machines, shown by Munscheid and Co., of Gelsenkirchen; Gildemeister and Kamp, of Dortmund; and of Wegge and Pelzer, are very efficient, and so easy to handle that, as at the mines in Wesphalia and Tremonia, two men will bore an air-hole 25 to 30 centimetres wide in 8 hours, through a pillar of coal 11 to 12 metres thick; Munscheid's machine will bore holes up to 52 centimetres width, which even allow a man to creep through. These air-holes are generally bored upwards, following the slope of the seam; they are, however, easier and faster executed by working in the opposite direction.

Among the rock-boring machinery we meet with Jordan's well-known hand-power pneumatic rock-drill, which, derived from England, finds much favour in German mines, as it will double, even treble, the effect of ordinary hand-boring, particularly in hard rock, and give a saving in tools besides; this useful machine is represented by the Märkische Maschinenbau Anstalt, of Wetter, in three stages, for quarries, tunnels, and mine work. The same firm exhibits the Beaumont rock drill, which works with compressed air derived from air-compressing machinery; while the well-known Humboldt Engineering Works, of Kalk, near Cologne, show two drills of the Sachs and Broszman types, mounted on a large columnar Neuerburg stand. This stand is considered as one of the most convenient for mining and tunneling purposes, and its column which allows of adjusting the drills in every direction, rests upon two wide iron tubes on wheels, one of which serves as a reservoir for the compressed air, while the other is intended for the cleansing water, which must be spurted in the bore-hole for the removal of the stuff as it is disintegrated by the advancing borer or bit. Both reservoirs are provided with cocks at each end, and to the fore-cock thin indiarubber pipes are fixed, which carry air and water to the respective drills while the after-cocks serve for the connection with the air-compressor or the water tank. When the holes are finished and blasting is to be done, it suffices to disconnect only the wide pipes of the after-cocks, when the whole machinery can be drawn back upon rails. This arrangement has proved very convenient when driving the Cochem tunnel of the Moselle Railway; recently, however, it seemed advisable in several cases to have for tunneling stands for four and six drills, and such were accordingly constructed by the Humboldt Company. Another very handy rock-drill for mining is exhibited by Wortmann and Frölich, of Düsseldorf, fixed to an upright columnar stand, which is fastened between roof and bottom of the heading by means of movable clamps. It has been largely employed at mines in Westphalia, Siegerland, Saxony, and the Hartz; while it was also used in several tunnels of the Gothard Railway and the Hesse-Ludwigbahn. The firm of R. W. Dinnendahl, of Huttrop, near Steele, presents its boring machines after the improved system Meyer, which is a successful combination of several older constructions; the drills are fastened to a movable columnar universal stand of the Neuerburg type; but the firm sells the drills also arranged upon trolly-stands for four machines, and with the ordinary tripod-stand. The Dinnendahl-Meyer drill did very good work at the Alexander adit level of the Miesbach Coal Company, near Bregenz, on the Lake of Constance; at the collieries Heinreich, Concordia and Roland, in Westphalia; and Maria, near Aix-la-Chapelle, where its durability was so good that it required no repairs for a whole year, while it could work very wery well with a pressure of 1½ to 2 atmospheres only. It may be here mentioned that an hydraulic colmnar stand, an imitation of the Beaumont stand, based upon the principle of the hydraulic press, has been lately brought out by the Duisburger Maschinbau Gesellschaft. The hollow column is filled with glycerine or water, and a plunger, which carries the clamp on its head, is lifted up in it by a small forcing pump, so as to fix the stand firmly between the sides or between roof and bottom of the heading. The same principle was introduced, about ten years ago, by Grüson, for heavy artillery lifting gear and for hydraulic lifting jacks.

Next to the rock-drills the air-compressing machinery, from which the former derive their motive power, may be noticed; thus the Märkische Maschinenbau Anstalt produce a dry air-compressor in three sizes, from 36 to 45 centim. diameter of the pumps, the largest of which is able to supply 9 rock-drills, when making 50 strokes a minute, with 14½ cubic metres of air of 4 atmospheres, with a consumption of 70 horse steam-power. The compressor, system Frölich, is exhibited by Wortmann and Frölich, and made at the Duisburg Engine Works; it is portable, and consists of the plate iron reservoir, to which the pump cylinder and the two small steam-cylinders, one at each side, are fixed, and which by a simple connection work the pump, while they are supplied with steam from a portable boiler. The fast compressor, with interior water cooling, exhibited by R. W. Dinnendahl, deserves especial notice, as it is an improvement in the right direction. It has three compressing cylinders, whose axes stand at 120° to each other, their pistons being worked by a crank disc in the middle, which again receives its rotary movement from a 3 cylinder steam-engine. By this arrangement the pistons are counterbalance l in every position, and a fly-wheel can be entirely dispensed with, while it will allow to make 160 strokes a minute with each piston. A certain quantity of cooling water is spurted in the cylinders with every stroke and runs with the air in the reservoir, from which it is again blown out continuously by the pressure of the former. The Dinnendahl compressor is made in 7 sizes, from 12 to 25 centimetres diameters of the pump piston, and the largest size will produce 137 cubic metres of air of 6 atmospheres, or 258 cubic metres of 3 atmospheres pressure in the hour; it is in successful operation at the Heinrich Colliery, near Kupferdreh, in Westphalia, and at the Libau Coal Company in Silesia.

After speaking of tools and rock-drills, we may mention a new explosive, the Atlas Dynamite of Mr. J. Engels, which has of late been brought out by the firm of Krebs Brothers and Co., of Cologne. The Atlas Dynamite No. 1, contains 80 per cent. of nitro-glycerine, and is said to equal in strength Nobel's explosive gelatine, while it will explode at any time, even in the cold, and thus dispense with the dangerous operation of thawing frozen dynamite cartridges. Another advantage over the latter is claimed by the entire absence of a residue after explosion, which could injure the lungs, when respired after blasting in confined places.

Looking at the improvements in shaft sinking, we find a very handy transportable pump for this purpose, provided with the suitable valves of Tometzek, and exhibited by L. Soest, of Düsseldorf. Of very great importance, however, is the exhibition by Haniel and Lueg, of the same town, with regard to shaft-boring apparatus, after the systems of Kind-Chaudron and of Lippmann. The first system was successfully employed by director Bruno Shutz in sinking five shafts at the Dahlbusch Colliery through the water-bearing marl of the Cretacean formation, which, as mentioned above, overlies the coal measures, while by the latter the shaft of Königsborn Colliery, near Unna, was lately completed with full success and under similar circumstances. Shaft-boring machinery and iron-tubbing for securing the shafts are specialties of the firm of Haniel and Lueg. The borer, which had done the work at Königsborn, and which alone weighs 21 tons, is exhibited *in natura;* it has the diameter of the whole shaft, and by being lifted and dropped alternately under water it disintegrates the bottom of the shaft, while it leaves the sides entirely unhurt, and the water filling the shaft exerts a counter-pressure upon them. The Kind-Chraudron system, which has lately come into use at the Mansfeld silver and copper mines, differs from the former in so far as in the centre of the shaft a wide bore-hole, but of very much less diameter than that of the shaft, goes in advance, and the ring of rock, which remains around it, is then bored out, when all disintegrated rock collects in the middle hole, from which it is easily brought to surface by the so-called ladle. Shaft-boring has proved to be particularly advantageous whenever the rocks which shall be reached are covered by thick water-bearing strata, as for instance of the Cretacean formation in the North of France, in a part of Belgium and Westphalia. By the Kind-Chraudron system, no less than 18 shafts in France, 11 in Belgium and 5 in Westphalia were sunk in this manner in less time and with less cost as would have been possible in the ordinary manner of sinking.

Bored shafts are necessarily round, and for their security they require an inner lining either with masonry or iron. The method of lining with iron, or tubbing, is generally adopted, and large cast-iron rings are let down in the pit and are most accurately piled one upon the other until they reach the surface. The space necessarily left between the tubbing and the rock is then filled out with cement or concrete in order to make it water-tight, and after it has hardened the water is pumped out and the bottom of the shaft becomes for the first time accessible. Such huge cast-iron shaftings for the Seegengottes shaft, near Eisleben, are exhibited by Haniel and Lueg; they have 4 metres diameter, are 1·5 metre high, and weigh 10 tons each.

For shafts, which can be sunk without much water in the ordinary way, a different system of tubbing with cast-iron segments came first into use in the North of England, and in 1856 it was introduced by an English miner, William Coulson, to the Hibernia Colliery in Westphalia. Coulson was an illiterate, self-made man, but first-rate in sinking and tubbing shafts; and when he died, not long ago, he had sunk and tubbed no fewer than 23 shafts in England and 5 in Westphalia. Since then the English system has been largely adopted, and cast-iron segments or tubbings are exhibited by Haniel and Lueg, and by H. Horlohe, of Ruhrort. They are 1·30 to 1·33 metres long, 0·60 to 0·64 metres high, and provided with flanges all round, and with ribs on their inner side. Another kind of securing round shafts with rings made from ⌐¬ shaped wrought-iron, has of late found much favour in several continental mining districts. Saarbrücken Mines send beautiful models of such iron pit-lining from the winding shaft Trenkelbach No. 2, of the Friedrichsthal Mine, and from the two air-shafts Camphausen No. 3, at Dudweiler Mine, and Erkershohe at Friedrichsthal; while similar models are exhibited by Hibernia Colliery, of Gelsenkirchen, and the Aachen-Höngen Coal Company. The Phœnix Iron and Steel Company, however, show the iron pit-lining *in natura*, by producing a system of two rings, which have 5 in. diameter; the rings are connected by eight struts, one metre long, and by two large cross-beams of double T iron. They are divided in three compartments, when the middle compartment is again divided by two short iron beams in a large section in the middle and a small one at each end. These cross-beams not only strengthen the pit-rings, but at the same time they are intended for separating the pumps from the lofts, and for offering facilities to fasten the pumps and guide-rods for the cages truly and securely. The de scribed system only weighs 1 ton 700 kilos.

For wide levels, airways, and principally transport galleries wrought-iron structures are likewise introduced in the shape of arches, or ellipses, made of double T iron; such iron fastenings are exhibited by the Saarbrücken Mines, the Hibernia Colliery, the Phœnix Company, and the Gutehoffnungshütte Iron and Steel Company, of Oberhausen. Another species of underground iron structure are the water-tight trap-doors in water-tight dams of masonry, which in the principal levels are walled across at certain places, in order to secure the vital parts of a mine against the sudden inroad of water from the water-bearing strata above the old workings, which may possibly settle down in such a way as to open a way for the water. These dams are provided with one or two strong iron trap-doors, which allow the ordinary passage, but in case of need can be secured by water-tight packings and strong fastenings. All provident mines have secured themselves in such a way against a sudden drowning out; for instance, the collieries Westende, Tremonia, Ringeltaube, Maria Anna, Neu Colin, Holland, Hanover, Engelsburg, Constantin, and many others. Such iron trap-doors weigh nearly 2 tons each, and are made of thick boiler plates, by Heintzmann and Dreyer, of Bochum, and by Piedboent, of Düsseldorf. In case that part of the mine behind a dam should have run full of water, there are pipes with valves provided, which pass through the dam and allow of a gradual tapping off.

Three systems of winning coal are represented by the Saarbrücken Mines, which have sent three large models, one showing the long-wall system upwards upon seam Carl; the other, the same sideways upon seam Mad; and the third, the pillar and stall system upwards upon seam Heinrich—all seams belonging to the mine Gerhard Prinz Wilhelm. General mining maps and sections of the mine Heinitz-Dechen, near Saarbrücken, with special plans of the workings upon each separate coal-seam of this mine, are also exhibited by the board of directors of the Saarbrücken Mines.

— DR. A. GURLT, of Bonn—in *Iron.*

THE TELEPHONE AND ELECTRIC ILLUMINATION.—During their present meeting at Swansea the members of the British Association will have the opportunity of witnessing two of the latest advances in the practical applications of electricity to the purposes of everyday life. Telephonic communication has been established between the Borough Surveyor's office in Swansea Town Hall and the Velindra Reservoir seven miles distant, and the latest improvement in electric lighting may be seen in the pavilion. On July 31 a detailed description was given in the *Mining Journal* of the improved and economic principle of lamp invented by Prof. Janin, of Paris, and adopted by the Compagnie Générale d'Eclairage Electrique; it was at the same time stated that Mr. J. A. Berly, C.E., was entrusted with the introduc-

tion of the system into this country, and it may be presumed that it was at his suggestion that the company undertook gratuitously to illuminate the pavilion during the Swansea meeting. The advantage, however, will be quite mutual, since not only does the British Association include scientists from all parts of the country, but its appreciation is the more valuable since it is not given until after thorough examination and discussion.

REPORT FROM CORNWALL.

Aug. 26.—Following immediately upon our last report, and as we presume on the first instalment of the revival we have confidently anticipated, the smelters raised the tin standards 3s., and thus again brought them up to the point of the first rise of the new year. It is quite within the bounds of possibility, though we anticipate and should prefer a slower and more steady advance, that Michaelmas will again bring prices up to their highest point for the year, that which they touched at the end of January. Everything appears to point to a period of considerable activity, and activity in mining matters means progress and prosperity—at least we may be tolerably confident it will do so now after the lessons that late years have taught. There is nothing that distinguishes our smelters so much now-a-days as their caution, and whenever they do move ahead we may be quite sure they have good reason. There has hardly yet been that increased activity in the share market that was to be expected, but it will not long be delayed. At present there are many capital opportunities for speculation at very light risks, if any.

The annual exhibition of the Royal Cornwall Polytecnic Society opens on Tuesday next under the excellent presidency of Canon Saltren Rogers, a gentleman who has always taken a very active and lively personal interest in the welfare and work of this and kindred associations, particularly of the Miners' Association, the chair of which he has also filled. The forthcoming exhibition bids fair to be a good average, and there will be additional interest in the fact that one of the accompanying lectures will be delivered by Professor Adams. As usual, the Miners' Association will hold their principal meeting on the Wednesday in connection with the Polytechnic.

Mr. J. H. Collins, F.G.S., has called attention to the character and value of several of the chief mineralogical collections in the West of England. The best of them are naturally to be found in Cornwall, but Devon has a few noteworthy ones. The two principal public collections in Cornwall are those of the Royal Cornwall Geological Society at Penzance, and those of the Royal Institution of Cornwall at Truro, each extensive, well arranged, and as local collections (but they are a great deal more than that) practically complete. Both of these are readily accessible to the public. There is a smaller collection, but one which has several points of interest, belonging to the Redruth Institution, and the Camborne Institution has another. In Devon the most accessible and the largest general collection is at Exeter, in the Albert Memorial Museum, which is always open to the public. There is a smaller collection (mineralogically, but one of great importance geologically) belonging to the Torquay Natural History Society at Torquay; and another in connection with the Plymouth Institution at the Athenæum, Plymouth—the latter, however, not properly displayed for want of sufficient room, and at present in a transition state. The sister borough of Devonport possesses, however, one of the finest old mineralogical collections in the kingdom, given to the town by the late Sir John St. Aubyn, grandfather of the present senior member for West Cornwall. This collection is kept at the Guildhall, not displayed, but in a cabinet, though it may always be seen on application. This is a very large and valuable collection; the specimens are for the most part very fine ones, including a good series of the metallic minerals known at the date when it was formed, and "a number of beautiful and rare silicates, including examples of most of the older gems." Indeed, diamonds, emeralds, sapphires, rubies, and opals may be said to abound. The only private collections of importance (though there are several excellent minor ones in both counties) are in Cornwall—the "Rashleigh," formed in the last century, and consisting almost exclusively of Cornish specimens—at Menabilly; the "Williams," at Caerhayes Castle, probably unmatched as a collection of metallic minerals, not from Cornwall only but all parts of the world; and the "Carne," at Penzance, the property of and largely added to by Mr. C. C. Ross, who kindly permits it to be seen by those interested in mineralogy. These few hints, for which we are mainly indebted to Mr. Collins, may be of value in the present tourist season to not a few of the scientific visitors who find their way "down west," and who, by the way, have lately included gentlemen from America, intent on procuring specimens for museums there.

The second of the three exhibitions at the Royal School of Mines, given this year in connection with the many examinations, has been awarded to Harry Collins, son of Mr. J. H. Collins, at the early age of 15.

A very curious case, involving a direct conflict of evidence, has been heard at the Stannary Court, in connection with the transfer of three shares in Wheal Agar, which it was denied on one side were ever sold or transferred at all, while on the other it was asserted with equal positiveness that they were. It is fortunate that the character of the defendant is above all suspicion or the decision would be a very unpleasant one; as it is it is clear there is a mistake somewhere.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

August 25.—If Mr. Yelland will refer again to my report of the 14th inst. he will see that I speak well of the Wotherton Mine as a barytes mine. I may also state here my belief that as such it is one of the best, if not the best, in the kingdom, but my contention is that for this very reason it cannot be reasonably expected to become a profitable lead mine. "Barytes" asks me to state "all and every condition geologically and mineralogically under which lead ore is found." Now, to do this would be rather a long business. There is a book on "Metalliferous Minerals and Mining," written by a Shropshire man, in which a brief recital of the principal ways in which lead ore is found extends over 50 pages, and an account such as "Barytes" asks for would probably require five times this space. Perhaps, however, he will be content if I state one or two conditions under which lead ore is not found in paying quantities. And first, it is an axiom I think with most miners of any experience that "lead ore is not found profitably in lodes solely or largely charged with barytes." The Snailbeach Mine is adduced as an evidence of a mine producing both lead and barytes profitably; but "Observer" and "Barytes" must be aware that the barytes is obtained from one part of the mine, and the lead ore from another. Then the strata of the Wotherton Mine are too high up in the Lower Silurian group of strata for us to expect lead ore in paying quantities there. The best lead mines in this group of strata are all worked about the middle of the Llandeilo beds, but at Wotherton the Bala beds come in. If "Observer" and "Barytes" will take Section No. 33 of the Government Geological Survey they will see that the vicinity of the Wotherton Mine lies in strata a thousand feet or more above those in which Snailbeach and the Roman Gravels Mines are worked. If they will enquire further they will find that there is not an example, either in this country or any other, of a lead mine being profitably worked in strata corresponding to those at the Wotherton Mine. Lodes containing lead ore in the Llandeilo beds become charged with barytes as they pass into the Bala or Caradoc series of beds. Of course if the Wotherton lode is followed downwards a thousand feet or so from the present bottom of the mine into the Llandeilo rock it might there become profitable for lead, and if this is what is intended to be done it is not for me to say nay. I am afraid after all that this advice gratis will not be thankfully received, but the criticisms in these reports aim at truth, and they must accept the consequences.

Through the recent advance in the price of lead a number of the men who were recently discharged from the North Hendre Lead Mine have been taken on again.

The prize of 30 guineas offered by the gentlemen attending the lead ore sales at Holywell, with a silver medal added by the Esteddfod committee, for the best essay on the Metalliferous Deposits of Flintshire and Denbighshire, with special reference to the ores of lead and blende with the laws governing their location, was awarded at the Esteddfod meeting to-day to Mr. D. C. Davies, F.G.S., of Oswestry. The judges were Mr. A. O. Walker, of the lead works Chester and Flint, and Mr. A. Strahan, F.G.S., of Her Majesty's Geological Survey of England and Wales. The essay, which was said to contain a map and numerous sections of mines and illustrations of ore deposits, is to be published. A prize was offered for the best Portable Manual Apparatus for Drilling Holes in Rock on the jumping principle for Blasting purposes. One machine was sent in. What its merits are we do not know, for the judges, represented by Mr. R. Owen, of the Welsh Slate Company's quarry, gave what appeared to me to be a decision on quite another matter. He said he and his coadjudicators preferred drilling by hand to machine drilling, a decision that might have been applicable if the competition lay between hand and machine boring, but one that is quite out of place on a question relative to the various capabilities of hand rock-boring machines.

Great interest gathers around the slate splitting competition which is now taking place, for which nine prizes are offered. The Pavalion yard is full of carts which have brought slate blocks from the various quarries. The blocks were carefully protected from the drying power of the sun, being wrapt in bags, and packed in shavings, and all the while men are busy watering the bags to keep the blocks moist for splitting. The judges are Mr. J. J. Evans, of the Penryn Quarries; Mr. R. O. Owens, of the Rhwybryfdir; Mr. Wm Davies, of the South Dorothea; Mr. Pearce Williams, of Alexandra. Thousands of quarrymen are here to witness the process, the result of which will not, I fear, be known in time for this report. The quarry people are in good heart, and I expect they do not know anything of the lugubrious state of things reported in the papers last week. The stocks are diminishing at the quarries; the Scotch market is opening, and a demand has arisen for the smaller sized slates, which was just what was wanted, and, altogether, a flourishing time is expected. Some of the quarries are changing hands, on the whole, for a fresh accession of capital. I may mention, as an example, the Bettws Garrnon; a good quarry with large capabilities, but which for want of funds has been worked on only a limited scale for some years past.

Strange doings at a Flintshire colliery have recently been brought to light by the prosecution at Caergwrie Petty Sessions of Mr. Wm. James Clark, colliery manager at Hope Pits. On May 22, an explosion occurred at the colliery, and the investigations which were made resulted in the discovery that the explosion was caused by a man, named Lewis, taking the top off his lamp, which had not been locked by the fireman. One of the witnesses at the hearing of the case admitted that his fellow-workmen did not see the fireman that morning, and their lamps were not examined. They were in the habit of doing this, and often went down the pit before anyone came. They were also accustomed to fire the shots without the place being examined The magistrates, in imposing a penalty of 5s. and costs in each of the cases against the manager, considered there had been great irregularities in the mine, but they had not been sufficiently known to the manager, who, however, should have exercised more vigilance.

THE TRADE OF THE TYNE AND WEAR.

Aug. 25.—There is little change in the coal and coke trades; the demand is still insufficient to keep all the works fully going, and enable the coal masters to get fair remunerative prices. The shipment of gas and other coal continues large, but the best steam coal works are not fully employed, though pits producing second-class steam coal for locomotives and other purposes have nothing to complain of. There is an improved enquiry for small coal for manufactory purposes, and users wish to contract for forward delivery, and there is a fair demand for coke. The house coal trade has somewhat improved, and prices have slightly advanced in the London market, but the rates are still very low, and this trade is far from being satisfactory. The dull state of this also reacts on other branches of the trade—for instance, in the coal trade, to which many coal masters have lately turned their attention. In Durham the gas coal trade shows most activity, and many of the works are fully all fairly employed. In the Spennymoor district the Trimdon Leasingthorne, and most of the works, are busy; at Trimdon a number of new coke ovens are to be erected immediately. The Trimdon Grange and East Hetton Collieries have passed into the hands of Mr. Walter Scott, of Newcastle, and as he is an enterprising and energetic man the works will be vigorously carried on in future; some important improvements are projected at these old-established works. Steady progress continues to be made at the important winning at Marsden, but some time must elapse before coal can be reached. In the meantime, the owners are developing largely the valuable limeworks on the estate. A large quantity of this lime is now sent by rail to the chemical works on the Tyne, and also to other points for building purposes.

It is expected that the dispute in the iron shipbuilding trade will be amicably settled during the present week. At part of the works the men gave notice for an advance of 10 per cent. in wages, and threatened to strike on Aug. 28 if this be not granted; the employers, we understand, have made an offer of an advance of 7½ per cent., and it is hoped that this concession will lead to a settlement of the question.

The general trade of the district continues to improve, although the progress is slow the continued advance in the traffic receipts in the local railways proves that progress continues to be made, and the iron trade shows marked improvement, not only in sales but in prices. The production of coals, chemicals, &c., is enormous, and is increased wherever a chance occurs of effecting sales; this prevents any substantial increase in prices. It is evident that if the demand continues to increase it must come up to the power of production in time, and only then will it be possible for the price of coal to be much increased.

The North-Eastern traffic receipts for the half-year are for minerals for 1878, 326,211*l.*; for 1879, 289,160*l.*; and for 1880, 350,729*l.* Thus the receipts for 1880 are 24,518*l.* in excess of the receipts in 1878. This company had last year a large amount of surplus rolling stock, but this is changed, and their rolling stock—wagons, &c.—are now fully occupied, and there is urgent necessity for an increase. At present the company contemplate a great enlargement of some of their carriage and wagon building and repairing works. Several in the northern districts are now fully occupied in meeting the demand for repairs and renewals of rolling stock. It is understood that they propose to make immense additions to the works at York to meet the demand. The Blyth Harbour and Docks Company continue to make improvements in the harbour and approaches, and the shipment of steam coal at this point is gradually increasing in quantity; more facilities are, however, required on the north side of the harbour, and when those are completed the shipment of the coal from collieries closely adjacent will be largely increased. Iron shipbuilding is also making progress here; three large ships are in progress at the shipbuilding yard.

The iron trade continues firm, and there has been a slight rise in rates; 44s. is now quoted for No. 3. Warrants are stationary, and there is no change in stocks. There is little speculation at present, as makers are very firm, and demand 45s. per ton for small lots. The shipments of pig-iron from the Tees have reached this week 18,357 tons, a slight increase on last week, and the exports of manufactured iron have also been large; 2000 tons of iron rails were sent by one vessel to America. Common bars are quoted up to 6*l.*, and shipplates 6*l.* 15s. to 7*l.* The steel trade is very good.

The directors of Bolckow and Vaughan have resolved to pay an interim dividend at the rate of 7½ per cent. per annum. The last dividend was at the rate of 5 per cent., and this may be taken as a fair index of the improvement in the iron trade. This firm has expended a large sum in the construction of steelworks at Eston, and those works are now rapidly approaching completion; but, of course, they have not yet been productive. When it was first intended to convert steel from Cleveland ore it was found that the ordinary Bessemer converters did not answer for the Gilchrist-Thomas process, although they were suitable for converting from hematite ores. The directors have, therefore, built two 15-ton converters, the largest in the world, and these are now completed and ready for use. They are lined with the new basic-brick, for the elimination of the phosphorus from the iron. In addition to this, the company have doubled their rolling-mill plant. It is expected that they will carry on the conversion of Cleveland pig iron into steel on a scale unparalleled. It is anticipated that Mr. Richards, the manager, will afford some interesting facts respecting these operations at the meeting of the Iron and Steel Institute. At Middlesborough, on Tuesday, there was a small attendance, owing to the absence of so many gentlemen connected with the iron trade at the meeting of the Iron and Steel Institute at Dusseldorf. There was a slight reaction in Cleveland rates, No. 3, 43s. Messrs. Connall's stores show an increase of about 300 tons on the week. The shipments of iron have been nearly up to the average, nearly 16,000 tons, and of manufactured iron 5000 tons. Scotland is still a large consumer. There are some furnaces to be blown in at Loftus, and the make will be enlarged. The manufactured iron trade is steady, and the mills are actively employed. Prices are firm, with little change. Bars, 6*l.*; ship-plates up to 7*l.* Coal and coke are quiet in demand. Mr. D. Dale will be asked to arbitrate in the millmen's claim for 7½ per cent. advance.

The unfortunate accident which has resulted in the death of Mr. Hawthorn, of the eminent firm of Black, Hawthorn and Co., Gateshead, is much deplored in the district. Mr. Hawthorn, in company with Mr. Black and others, founded their works in 1866, and they have been extended until they now rank high in this district as marine engine works, locomotive, and general engine and boiler works. Mr. Hawthorn was an accomplished engineer, and highly respected as a man, his genial and affable manners endeared him to all who came in contact with him, he was much respected by his numerous workmen, and his loss is generally and deeply regretted.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Aug. 26.—At the meetings of the iron and coal masters yesterday and this afternoon in Wolverhampton and Birmingham respectively very little business could be done in either coal or coke. Firing coal was, however, in better demand for local gas companies use. Pigs were steady, but without much new business, consumers having already well bought forward. Blaina hematites were reported to have sold at a price equal to 80s. delivered. Native pigs were unaltered in price upon the rates given in my last. The attendance of finished ironmasters was thinner than usual consequent upon the Iron and Steel Institute's annual meeting on the Continent. Sheets were scarcely in so brisk sale, yet makers still quoted 8*l.* as their price. Hoops for America are in increased make, 6*l.* 15s. at the works is the price asked for ordinary hoops for home consumption.

As I anticipated would be the case the Tipton petition for exemption from the Mines Drainage Act has failed. A special meeting of the committee for that district was held in Wolverhampton on Wednesday at which the law clerks and the secretary reported that the document did not possess the requisite number of signatures to make it valid. This announcement is generally regarded as good news for the coal and iron industries of South Staffordshire, as it is felt that a threatened disaster has been averted. It is expected that a special meeting of the whole of the commissioners will be soon called to receive the announcement officially.

The Cannock and Huntington Colliery Company have issued their annual report. The work of clearing away the broken fragments of the iron tubbing in No. 1 pit has now been practically completed. Part of the sheet-iron lining in the bottom of the pit has been disturbed, so that it has encroached upon the clear diameter of the pit about 9 in. This difficulty can, however, be got over. The lowering of the tubs in the No. 2 pit would have been commenced before now, but about 4 yards of sheet-iron lining has been ordered to be placed at the bottom of the shaft. The whole of the tubbing required for both pits has now been cast, and the foundry will shortly be closed.

At the Midland Steam Boiler Inspection and Assurance Company meeting, held in Wolverhampton on Wednesday, it was stated that none of the boilers under the care of the company had exploded during the past year, or indeed the year previous, although no fewer than 3203 boilers had been under their supervision. Of this number 1240 were under inspection, and 1963 were assured. During the twelvemonth 13,649 inspections had been made. The boilers under the company were employed as follows: Collieries, 1374; ironworks, 1075; and mills and otherwise, 753.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

Aug. 26.—Business at the mines and ironworks in Derbyshire has undergone little change of late. In the lead districts about an average quantity of ore is being raised, but there are only a few mines that can be said to be paying, the majority being in the hands of working men without capital, many of whom barely get labourers' wages. Not much is being done as regards the raising of ironstone in this county, for there is not now one-half of the quantity obtained that there was a few years ago. This is not owing to exhaustion, but to the fact that it can be bought rather cheaper in Northamptonshire, notwithstanding the railway rate. House coal is still in but moderate request, so that the mines are still on short time. Still a fair tonnage continues to be forwarded to the Metropolis. In steam coal rather more has been done of late for locomotive and other purposes. Gas coal and engine fuel are quiet. There has been a steady demand for raw iron, and late advances have been fully maintained. The rolling-mills have been kept fairly going, while some of the foundries are better off than they were.

Trade in Sheffield continues active in most of the iron and steel branches, and the prospects as regards the remainder of the year are most encouraging. Makers of Bessemer rails are doing very well, and there is every likelihood of prices going up, seeing that hematite pig has been advanced. The rolling-mills are fully employed on sheets, plates, hoops, and wire, whilst a good demand has sprung up for steel plates for boiler and other purposes. Some good orders have been booked from America for general cutlery, whilst sheep-shears and ordinary hardware are being extensively forwarded to Australia and other of our colonies. Just now our manufacturers have been engaged in studying the proposed change in the French tariff as regards our iron and steel products; and it is said that, should the proposed change take place, it would have the effect of entirely destoying the cutlery trade with France. The new Russian scale of duties as regards our manufactures is far more satisfactory, and are even easier than they now are. The Coal Trade of South Yorkshire has undergone no change; so that, as a rule, the men are not working more than four days a week, whilst prices are such that the owners are working their pits at a loss. Steam coal sells well enough, a large tonnage going to Grimsby for shipment to Russia. The demand for London is still moderate, owing in a great measure to the rate charged by the Great Northern Railway Company. The present seems a most opportune time for trying the scheme brought forward in the Journal by Mr. Thompson for taking coal to the Metropolis *via* Boston Deeps, of which little has been heard in the Barnsley district, where the seams of coal are scarcely equalled in value by those in almost any other part of the kingdom.

At the Monk Bretton Colliery, near Barnsley, where the men have been on strike for nearly a year, work goes on as usual, and the manufacturer states that he will not have any communication with them as a body. A good many, however, have resumed work on the owners' terms. At the Barrow Iron Company's Colliery only a few men are employed. The pits belonging to the Wharncliffe Silkstone Company, amongst the largest in South Yorkshire, are about to be closed in consequence of the depressed state of trade and the low price at which coal has to be sold.

The annual meeting of Henry Briggs, Son, and Co. (Limited) was held on Wednesday, at Whitwood, Mr. H. Currer Briggs, managing director, in the chair, when there was a good attendance of shareholders. The report showed a balance of profit of 13,040*l.*, out of which the directors recommend a dividend of 2½ per cent., which was adopted. The year's sale had been the largest, the Chairman explained, but the margin of profit had been the least in the company's experience, owing to the reduced average price of coal, lessened consumption, and the use of the cheapest coal. He thought, if the trade continued as it was, they would soon see only the "survival of the fittest" collieries. He didn't know of a limited colliery company that had paid a dividend the last half-year, and he didn't know that

the balance was struck that there was a profit. He found they had made a reduction in the cost of working of 22·6 per cent. in the last five years, but the reduction in price of coal was 30·39 per cent., a difference of nearly 8 per cent. The liabilities had been reduced from 24,337*l.* to 19,572*l.*, but the debts due to the company were 1800*l.* higher. Imperial taxation had decreased 5 per cent., and the local taxation of the works was 1000*l.* a year more on the five years. Mr. Briggs having explained various matters concerning the balance-sheet and the company's position, proceeded to refer to the Employers' Liability Bill, which, he said, might be more properly termed the Workmen's and Lawyers' Compensation Bill, for, in consequence of the vagueness of the sub-section 3 of section 1, as to the responsibility of "agents" and persons in authority, even a hewer might be held responsible for any damage done to the hurriers. As it stood the Bill would lead to much litigation, but he proposed the House of Lords would make the limitation of responsibility more distinct, while retaining the principle of the Bill. He mentioned that a Mr. Caister, of the Traders' Wholesale Stores (Limited), London, had sent out a circular to counteract co-operative stores (the best customers of the company) using his name as a director without his knowledge or sanction. Thanks were voted to the directors, and Messrs. R. Tonge and Geo. Robson re-elected on the directorate. Mr. J. Diggle was appointed the working director for the year.

REPORT FROM NOTTINGHAMSHIRE.

Aug. 26.—A steady business continues to be done in pig-iron, and stocks at the leading works have been reduced, whilst prices are firm. A good deal of ironstone continues to be received from Northamptonshire, where it is worked on an extensive scale by the Stanton Company, the largest in the county, and where there is also a large foundry. Pipes have been in fair request, as well as air compressors and colliery appliances. Merchant iron, particularly bars, has sold more freely of late at the fully advanced rates, whilst prices have still an upward tendency. At the collieries the men are still on short time, there being but a poor demand for house coal in particular, whilst prices are not such as to leave profits for the colliery owners. A few of the pits have been doing a steady trade with the Metropolis, being eligibly situated, and having a favourable rate by railway, as compared with other districts more northwards.

From Annesley in particular a rather heavy tonnage of soft coal has been sent to London, the Midland alone taking at the rate of about 1700 tons a week, whilst more than 1000 tons a week have been sent from Bestwood. The land sale is comparatively quiet, as is usual at this period of the year, so far as regards house coal. In steam coal there is a fair trade being done, a good deal being absorbed by the furnaces as well as locomotives. Gas coal goes off in seasonable quantities, and some of it is of exceptionally good quality, the cannel from the Clifton Colliery giving a very high illuminating power, at the same time producing a good quality of coke. From the Hucknall Colliery a considerable tonnage of coal has been sent southwards. Engine coal is still in but moderate request, and the same may be said with respect to smithy slack and all descriptions of small coal.

REPORT FROM THE FOREST OF DEAN.

Aug. 26.—Perhaps the most important feature of the week is the half-yearly Crown audit of the Forest of Dean galees, which was held at the Speech-house on Tuesday, when Mr. G. E. Francis, the Crown Receiver, ably performed the duties of chairman at the dinner to which he invited the proprietors. The invitation was responded to by a large number of colliery proprietors, and a most enjoyable afternoon and evening was spent The Chairman, after the dinner, said he found from the reports of trade a more favourable state of things, and hoped, the foundation being laid, it would be of a permanent and solid character, even though of slow growth. Adverting to what he regarded as greatly militating against the Forest, he mentioned the free-miners' questions. He said all the Forest mines had been extended, and, as the position now stood, the growth of the district was checked, and he feared that never again would men of capital launch out their capital to open out unworked collieries and iron mines unless the free miners' question was taken practically in hand. Having referred to the question of local taxation, he drew attention to the stoppage of the Parkend Collieries in the western part of the Forest, and mentioned that in some of the villages the results were simply miserable in the deserted houses, and he thought it to be a fact that the best men had either emigrated or gone north to seek work, leaving an old and infirm population behind. Messrs. J. T. Thomas, W. B. Brain, Crawshay, Letcher, Ward and others responded to the several toasts—Mr. Ward representing the Crown Officers. The health of Mr. Francis, proposed from the vice-chair, having been received with great cordiality, the assembly separated.

We have on more than one occasion incidentally referred to complaints by workmen at Lydney and Lydbrook Tin-plate works, but failed to learn exactly where the fault was. The men alleged that they were underpaid, whilst the employers alleged the contrary. It appears that between two and three years ago it was arranged that the men should allow the masters one box of tin in every hundred to cover waste in manufacture, which the men alleged was to exclude all deductions; but the masters asserted that it was not so, but that they paid the men provisionally, and subject to revision at annual stocktaking; and when the stock was last taken it was found that there was a serious deficiency. This led to deductions, which the men resisted, and hence the case went to the Monmouth County Court, the men being supported by Trades Unionists. Witnesses were called on both sides, and the case received special attention. Messrs. Thomas offered the men at the time that if they could show that they had done the work that they claimed wages for the money should be paid to them, but that they failed to do. Mr. Clifton, of Bristol, who appeared for the plaintiffs, said that he had been very falsely instructed. After hearing the case very patiently the Judge decided that the plaintiffs could not recover. Judgment for the defendant, who did not ask for costs. We presume that the hearing of the case, and the decision by Judge Herbert, will be likely to exert a wholesome influence through the district.

The local colliers are attempting to revive the Union, but with what success we are unable to say. The former agent declined to act for the men in the matter (if he was really asked), and so a Mr. Brown, from Staffordshire, has been holding a number of meetings among them in different parts of the Forest, but comparatively little attention was attracted by the effort. It is right that men should obtain fair wages, but the question of remuneration must largely depend upon the state of trade, and it is desirable that forbearance and mutual consideration should exist between employers and workpeople.

There is little alteration in the state of trade since our last. It does not seem, judging by the reports from other parts, that improvement has been so considerable in the Forest as in some other places. There is comparative slackness in the tin-plate trade, nor is there briskness in the wire trade. In some cases the coal trade is fairly active, but at other collieries only partial employment is found for the men. It is much the same in the iron trade, though it is satisfactory to note that the recently large stock of pig at Cinderford furnaces has been much reduced, and we understand is likely to be cleared out, or nearly so. If some nut or screw firm would set agoing new works on the eastern side of the Forest we think that there is a good opening, coal and iron being abundant on the spot, and labour would be at command at more reasonable prices than in some districts. If the colliery proprietors could see their way to uniting manufactures of suitable kinds with the coal trade we believe that it would prove advantageous to them as well as to the district in every sense. In such a case a colliery would not be dependent for business and success, but would have two strings to its bow.

The old jog-trot pace of business, being content with old methods, and simply waiting for demand for household supply of coals, has been a great drawback to enterprise in the Forest. We trust, however, that new works and improvements will come, for materials certainly exist in the district capable of being turned to good and profitable account.

MINING LEGISLATION IN INDIA.—Frequently the Government of India has had its attention directed to the necessity of some legislation after the fashion of the Mines Regulation Act in this country. It has been especially desired to prevent loss of life hereafter from colliery inundations by the piercing of workings now open, but which by-and-by will be abandoned. These sources of mischief are numerous in India, where a great proportion of coal mining is carried on without any working plant, and where petty adventurers have mischievous liberty to start shallow mines without possessing working plant or a skilled staff of employees. An official document before us shows that out of four collieries in Bengal visited by Mr. W. Ness two were found to be approaching old pit workings containing a dangerous accumulation of water, yet the usual precautions were not being observed. The ventilation likewise was so defective that a light could be scarcely made to burn. Like Mr. Blandford in his late report on the Ranigunge coal field, Mr. Ness would have the Government—by the registration of plans of abandoned works—take precautions against the spread of the inundation danger, but he would do more. By a brief Act of about five clauses he would have the coal mines of India placed under such inspection as would be applicable to the stage at which the industry has arrived throughout the empire. After conference upon the subject with the Hon. Rivers Thompson, Mr. Ness has, at the request of that officer, forwarded his views in the form of "Suggestions" to Mr. H. B. Medlicott, superintendent of the Geological Survey of India. By Mr. Medlicott they have been printed and passed on with his own "Comments" to the Secretary to the Government of India—Department of Revenue, Agriculture, and Commerce—for submission to the Governor-General in Council. The superintendent of the Geological Survey asks attention to the "Suggestions" by remarking that the subject has "on several previous occasions been brought officially to notice, and Government has formally acknowledged its share in the responsibility of the neglect of such simple measures of precaution; but no one having the same practical authority as Mr. Ness has as yet spoken on the subject." In the interest of the established mining concerns of India, no less than in that of humanity, it is to be desired that the Government of India may soon find itself in a position to take up so desirable a piece of domestic legislation as is here suggested.—*Engineer.*

Meetings of Public Companies.

COLOMBIAN HYDRAULIC MINING COMPANY.

The ordinary general meeting was held at the offices of the company, Winchester House, Old Broad-street, on Thursday,

Mr. J. T. P. PECHEY in the chair.

Mr. SYDNEY A. COBBETT (the secretary) read the notice convening the meeting. The report and accounts were taken as read.

The CHAIRMAN said, as the shareholders were aware, the profit made during the past year amounted to 1358*l.*, a sum sufficient to meet all their current expenses, and when it was remembered that when this company was formed they did not expect to make any profit whatever until the new sluice was in at Malpaso Mine, and that they had made a loss during the first five months, he thought the result must be considered as very satisfactory indeed. When they looked back at the almost chaotic state of the undertaking a year ago, they had every reason to congratulate themselves on the present position of the company's affairs. It would be remembered that when this company was formed its principal object was to bring in the new sluice at the Malpaso Mine at a deeper level, so as to enable them to work the rich gravel which they had every reason to believe existed in the bottom of the mine. When the superintendent first talked of bringing in the new sluice he intended to do so through an entirely new outlet, but he found that this was a work involving so much labour and cost as to be impracticable with the then resources of the company. Mr. Welton had, however, found a plan feasible, "by which," in the words of the report, "a new sluice is being brought in at a very moderate expenditure." They had that morning received advices from the mines with reference to the new sluice, in which Mr. Welton said that during the month he has advanced 133 ft., making a total of 639 ft. completed, and he hoped to put in another 109 ft. during the current month. The advices received from the mines also informed them that the profit which had been made during the past month was, it is calculated, just 100*l.*, which was about the same as they had been getting from the upper ground lately, and Mr. Welton seemed to think that when he gets fairly to work at the new point at Malabar he will be able to make a profit of 8500 a month from that mine. He (the Chairman) could only hope that it might be so. He thought the time was not far distant when Mr. Welton would require additional pipe at Malpaso, and that he would then either transfer the pipe from Malabar or have additional pipe sent out. All these matters were, however, so fully entered into in the reports of the directors and superintendent that he felt there was very little left to say. It was very pleasing to notice in Mr. Welton's report that he had never seen Malpaso looking better. He (the Chairman) thought that in that shaft, some 25 ft. below the present workings, they had developed enough to show that they would have good returns when they commenced washing below. It was ordinarily found that when a channel of auriferous gravel dipped down to the centre the ground in the centre and bottom was immeasurably richer than in the upper workings. Nearly all the ground was covered with native tailings, varying from the size of a small marble to that of large boulders. When they got deeper, so as to have a larger quantity of new dirt to mix with the tailings, they ought to be able to wash nearly double as much as at the present time. With reference to the accounts, they had been presented as clearly as possible. A year ago he had been asked whether he could tell the shareholders what their working capital was likely to be, and he then stated that he believed they would have 1800*l.* or 2000*l.* in hand, and if they took the liabilities on one side and the assets on the other it would be seen that they had that amount pretty well intact at the present time. They had paid all the working expenses, and they had a balance in hand of 2200*l.* or 2300*l.* He did not know that there was anything else in the report or accounts to be had specially to notice. He could only say that as they go on working the mine their belief in its future prospects continues to increase, and he thought that before long they might look forward to very good profits indeed, for anything over their present profit would become available for that magic word they all liked to hear so much—dividends. The Chairman then moved the adoption of the report and accounts.

Mr. C. HOPKINSON, in seconding the motion, expressed a hope that at this time next year they would present a still more satisfactory report.

Mr. SMITH asked whether there was any reason to believe that they would be materially impeded by the boulders in the gravel, and whether they were likely to meet with the pipe-clay? The pipe-clay at Malabar, it would be remembered, gave them a great deal of trouble. With respect to the remark in the accounts "this does not include law costs, which have yet to be settled," he asked what those costs were likely to be? Altogether he thought they might congratulate themselves that though they had not yet reached the goal their prospects were brighter than they had been previously.—The CHAIRMAN, in reply, said that Mr. Welton in his letter received that morning stated that he had passed entirely through all the boulders, and he did not believe there would be any further obstacles. They had 15 ft. face, and as far as they had gone ahead the ground was perfectly clear, and there was no pipe-clay to cause any inconvenience at the Malpaso Mine.

Mr. C. O. ROGERS remarked that boulders were not always a bad sign by any means.

The CHAIRMAN added that with regard to the law costs, they arose out of the matter which would be in the recollection of the shareholders. They had now been settled for 486*l.*, besides which there was a sum of 100*l.* for the liquidation of the old company and the formation of the new one.

Mr. THOMPSON thought the report was the most satisfactory which had ever been put before the shareholders, both as regarded simplicity and straightforwardness. He wished to know how long it would probably take to get through the 698 ft. of sluice referred to in Mr. Welton's report, and what were the heights of the banks they were likely to meet with when they finished, and what were likely to be the returns? He also asked whether, so far as the directors could see, they had any reason to anticipate that it would take an exceedingly long time to get to the banks which had been spoken of as likely to bring such large returns?—The CHAIRMAN, in reply, said Mr. Welton expected to arrive at the place where he could wash gravel within about six months. There was no pipe-clay of any consequence; and with reference to the heights of the banks the faces at the present time were about 15 ft. high, all tailings. Within six months the superintendent expected to get to the banks, which even then were some distance from the shaft, but he would be on the bottom, and they had reason to expect to find as good gravel as they had ahead. As to what the returns were likely to be, the shareholders were as well able to form an opinion as he was. In three or four months they had, under disadvantageous circumstances, once taken out 820,000 of gold, and they had also wheeled out from below the present sluice some dirt which yielded very largely. They had found ground halfway down the shaft, worth, according to a "prospect" from a pan of the gravel sent home by the superintendent from 85 to 810 per ton; but that must not lead them to form too sanguine expectations.

Mr. SMITH: I suppose one dollar would pay us a good dividend.

The CHAIRMAN: Yes; the dollar, or 50 cents even. The Chairman added that he thought the time had not yet absolutely arrived when the pipe was wanted at Malpaso, at the new openings.

Mr. GRAY did not think they should adopt any plan, or let it go forth that they were going to relinquish the Malabar Mine, because they had a good mine at Malpaso. If Malpaso required a little more pipe, why should they take it from Malabar, which had throughout the past year left a profit, which, though a small one, was better than nothing, and would probably be increased in future. Taking the actual facts, Malabar had during the past year yielded a larger profit than Malpaso. It was the duty of the superintendent to make both mines pay if possible, and there should be no bias in favour of one at the expense of the other. He believed both mines would pay, and pay handsomely. He did not for a moment wish to depreciate Malpaso, but, with all deference to the Chairman, he thought the result of the past year's operations had borne out the fact that Malabar was a valuable mine. Undoubtedly the ground was richer at Malpaso, but they had counteracting advantages at Malabar, and he thought they should work both properties fairly and properly.

Mr. THOMPSON thought the matter of the removal of the pipes, if necessary, should be left to the superintendent; but as one of the largest and oldest shareholders, he trusted that if better results could be achieved by such a removal, that in the interests of all concerned it would be made. It was true that they might have 100*l.* a month profit at Malabar, but it was very precarious, and if derived would only give them about ¼ per cent. on their capital; whereas Malpaso had actually formerly given a profit of 1000*l.* in one month.

The CHAIRMAN said he thought Mr. Welton was the best judge as to what should be done in this matter. It was, however, only right to point out that the greater part of the profit at Malabar, to which Mr. Grey had referred, had been derived from the old workings. The actual profit at that mine had been only 136*l.*, and that had been made under exceptionably favourable circumstances as to costs, &c. Under ordinary circumstances the mine would have paid nothing whatever.

Mr. GREY asked what would be the cost of a new pipe for Malpaso?

The CHAIRMAN replied that it would be about 400*l.* or 500*l.*, and it was a question whether they should go to that expense while they had the pipe at Malabar. (Hear, hear.) In any case, no great damage would be done to the mine by shutting it up, as it could easily be opened again if their circumstances justified it.

The report and accounts were then unanimously adopted.

Mr. HOPKINSON in moving the re-election of the retiring directors, Mr. J. T. P. Pechey and Mr. H. T. Sankey, said Mr. Pechey's services to the company had been of a most invaluable character, and he did not know what the company would have done without them. (Hear, hear.) Mr. Sankey was a recent acquisition to the board, whose legal knowledge had been of great value to the company.—Mr. STEEL, in seconding the proposition, remarked that the resuscitation of the company was largely due to the zeal and ability displayed by Mr. Pechey. (Hear, hear.) The proposition was carried unanimously.

On the motion of Mr. SMITH, seconded by Mr. GREY, Mr. L. H. Evans, who had been temporarily appointed by the directors was re-appointed auditor for the current year.

On the motion of Mr. THOMPSON, seconded by Mr. BRIEN, a cordial vote of thanks was passed to the Chairman and directors, and the meeting then terminated.

WEST CARADON MINING COMPANY.

The first ordinary meeting of shareholders was held at the offices of the company, Gracechurch-street, on Wednesday,

Mr. H. L. PHILLIPS in the chair.

Mr. JOHN WATSON (secretary) read the notice calling the meeting.

The accounts showed that the amount of money in hand was 497*l.* 3s. 2d., and the SECRETATY stated that there are no merchants' bills outstanding. The accounts were passed.

The report of Capt. Richards was then read, as follows:—

Aug. 24.—In handing you my report for the general meeting, to be held on Aug. 25, I beg briefly to state what has been done since we commenced operations in March last. We began by fixing and repairing footways, of which near 300 fathoms have been fixed and repaired in shafts, winzes, and old workings, and are now in a safe and proper state for the future working of the mine. In addition to this, we have cleared and secured long runs of levels before we could reach and examine some of the points now being wrought on. We have also opened out on several lodes and branches, but the chief drivages in this part of the sett have been confined to the 38 and 50, on Vivian's north lode, west of Hallett's cross-course. In the 38 the lode has varied from 1 to 3 tons of copper ore per fathom, and will now yield 2 tons per fathom. The same lode in the 50 has varied from 1 to 2½ tons per fathom; in the present end the lode is disordered by cross-heads and branches, consequently the lode is at present poor. In driving the 27 west, on north part of Menadue lode, it has yielded from 1 to 2½ tons of copper ore per fathom; present value ½ ton per fathom. The lode in the back of the adit level, on Gilpin's lode, is worth 8*l.* per fathom. The winze sinking below the 27, on this lode, is over 2 ft. wide, and will yield 1 ton of copper ore per fathom, and, as stated in a former report, this is an important point, no level being driven under it; consequently there are hundreds of fathoms of unwrought ground on this lode alone, and although the lode at present is not rich the indications are good for the production of copper ore. We are also driving a cross-cut south of Gilpin's lode, in the 17, west of main cross-course, with a view of intersecting Kellow's lode; this lode in the deep levels produced large quantities of rich ore, but has not been seen above the 27, therefore I think it highly probable that this lode will be found as productive in the shallow as it was in the deeper levels.

There are other points well deserving attention, which will be tried as soon as convenient; and now the Menadue ground is secured the most promising feature in the working of these setts is the driving of a cross-cut south at Hallett's shaft on the cross-course at the 38, which will intersect five lodes, each of which produced large quantities of rich ore in the eastern part of West Caradon, this cross-cut being about 10 fms. west of our boundary will prove the lodes both for this and the proposed New West Caradon Mine. To do this a small rotury engine should be erected (say) of 50-horse power; this would serve for winding, crushed, and pumping, and all this can be done, comparatively speaking, with a small outlay. In conclusion, I beg to say that, looking at the immense quantities of ore raised in the eastern part of the sett, and the large amount of profits divided amongst the shareholders (over 120,000*l.*), I do not think there are many, if any, better speculations in the eastern part of the county.—N. RICHARDS.

P.S.—Since the above report was written, information has been received that Vivian's lode at the 38 has improved to 2½ tons of copper ore per fathom, and in a winze sinking on Menadue lode below the 27 there is a lode worth 2½ tons of ore per fathom, the ore being worth 10*l.* per ton.—N. RICHARDS.

The CHAIRMAN: You consider that by driving on the cross-course you will intersect those lodes which you refer to?—Capt. RICHARDS said he expected to intersect the lodes in Menadue; but the lodes were close to the West Caradon boundary, and he certainly thought they should be proved.

The CHAIRMAN asked Captain Richards his opinion of the 27 fm. level under Gilpin's lode?—Capt. RICHARDS said they were sinking on the course of the lode, and he thought it was the cheapest and easiest way of proving the lode. There were two beautiful walls, and he was glad to say that the indications at present were good.

The CHAIRMAN said he had been much struck with the specimens of ore from the mine.—Capt. RICHARDS said that in the adit level they drove through some rich ore, and he put up a short rise, and before they had gone up 3 ft. they found some splendid stones of ore.

The CHAIRMAN: How much ore have you broken?—Capt RICHARDS said about 40 tons, but by the time an engine was erected there would probably be over 50 tons. Some of the ore was worth from 10*l.* to 15*l.* per ton. It was very good-looking ore—a yellow copper ore—and some which had been got out produced 24 per cent. of copper.

The CHAIRMAN: To what depth are we permanently drained by the South Caradon?—Capt. RICHARDS said about 120 fms. from surface, and they could work to that depth without pumping. An engine of 50-horse power would be ample to do all the work which had to be done.

The CHAIRMAN said he hoped they would have been able to do without an engine.—Capt. RICHARDS said they must have an engine for drawing and so on. There were several tributers wanting to go to work, but they could not be put on, as there was nothing to draw up the ore.

Capt. RICHARDS, in reply to Mr. Wilson, said he hoped to get an engine and boiler, and have them erected for less than 600*l.* The old engine-house could be utilised, so that there would be no expense for building.

The SECRETARY, in answer to the Chairman, said that the present monthly cost was from 100*l.* to 115*l.*

A SHAREHOLDER asked what extra monthly cost the engine would entail?

Capt. RICHARDS said from 15*l.* to 20*l.* per month. When the engine was erected they would probably return 30 or 40 tons per mouth, but it would not be wise to do it. What they wanted to do was to get down and cross-cut and prove the new mine, and this could not be done without an engine.

Messrs. Matthew Loam and Son, of Liskeard were then appointed engineers to the mine.

On the motion of Mr. WILSON, seconded by Mr. O. WEBB, it was resolved that in view of the necessity of erecting a steam-engine, a call of 2s. 6d. per share be made, payable on or before Sept. 8. It is estimated this call would realise 750*l.*

The SECRETARY then informed the meeting that he had obtained the grant of an important piece of ground called Menadue, adjoining the West Caradon Mine, in which there was a shaft through which the grantor gave permission for ore to be drawn from West Caradon. This would be of great importance to West Caradon, as it would save time and expense in drawing the ore. In consideration of this the West Caradon grantors gave permission to Menadue to deposit the "deads" in West Caradon. It was for the adventurers to decide whether this new ground should be worked as part of the West Caradon or as a separate and new mine.

Capt. RICHARDS explained that it was proposed to take up the cross-cut in the new ground where it was left by the former workers, with the view of intersecting the five lodes. He believed that one of them would be intersected in four or five months, but of course it was impossible to say this with any certainty. He believed they would reach it before they got 15 fms. No timbering would be required.

The SECRETARY pointed out that any discovery which was made in the new ground would greatly enhance the value of the West Caradon property. He might state that Capt. Richards had drawn up a report which he would read:—

Menadue sett is in the parish of St. Cleer, its east boundary is the west boundary of the south part of West Caradon Mine. It is 240 fms. long from east to west on the run of the lodes and 190 fms. from north to south. Six of the lodes which yielded large quantities of copper ore in West Caradon pass through the sett—namely, Menadue lode, Little North lode, Main lode, Downing's lode, Clymo's lode, Jope's lode. Of these the main lode has been worked on to a small extent to the 60 fm. level from surface, and upwards of 13,000*l.* worth of copper ore returned from this lode. A most important feature in connection with the ground is a north and south cross-course called Hallet's, in the eastern part of the sett. About this cross-course the Menaude lode was very rich in West Caradon. None of the lodes above mentioned except the Menadue lode have yet been seen about Hallett's cross-course in the Menadue sett. The workings on the main lode are all to the west of the cross-course; the 27 and 38 fm. levels on this lode were driven west from West Caradon up to it, but they missed the lode about the cross-course.

A few years ago a cross-cut south was commenced from Hallett's shaft on Menadue lode in the cross-course with a view of cutting the other five lodes about the cross-course. This cross-cut was at the 38 fm. level—that is, 72 fms. from surface. It was extended 64 fms. south, but the company abandoned the mine before either of the lodes were cut. I consider it a first-class speculation to continue this cross-cut to reach the south lodes, which, having been very profitable in West Caradon, we may reasonably expect will yield a lot of ore about the cross-course. With regard to the main lode, the prospects are more than usually favourable; it having been rich both east and west of the cross-course there can hardly be a doubt that there must be a deposit of ore in connection with it about the cross-course. I would strongly recommend the 38 cross-cut south, above referred to, being pushed on with all possible dispatch, which could be done at a cost of from 50*l.* to 60*l.* per month, including everything, the mine being dry to that depth.—N. RICHARDS.

A discussion ensued, in which Mr. WEBB, Mr. RISLEY, Mr. WILSON, and other gentlemen took part. The great value of the new grant was unanimously acknowledged, and the main point discussed was whether it should be worked as a new mine or as a part of West Caradon.

The SECRETARY, in reply to a question, said there could be no difficulty whatever in working the two properties separately; their interests could not clash in any way, and, of course, care would be taken to have the respective rights of the two companies clearly defined.

In the end it was resolved that the new mine, known as Menadue, adjoining West Caradon, be worked as a separate company, on the Cost-book Principle, under the name of the New West Caradon Mine, to consist of 6000 shares, such shares to be offered *pro rata* to the present shareholders of West Caradon, at the rate of 2s. 6d. per share (for the working capital of the mine), to be payable on or before Sept. 8, and all shares not accepted or paid for at that date to be placed to the credit of the New West Caradon shareholders, to be dealt with as they may hereafter decide.

It was also resolved that the present officers of West Caradon be appointed officers of the New West Caradon *pro tem.*

A resolution was also passed to the effect that a meeting of adventurers in the New West Caradon Mine be held not later than that day month, at a date to be fixed by Mr. Watson.

Mr. WILSON then proposed a hearty vote of thanks to Mr. Jno. Watson for obtaining such a valuable addition to the West Caradon property, and also to Capt. Richards for the great services he had rendered in connection with the same business.

A SHAREHOLDER said he had very great pleasure indeed in seconding the reso-

lution; he thought the shareholders should be greatly obliged to Mr. Watson and Capt. Richards for so largely increasing the value of the property.

A Shareholder said he had such a high opinion of the new grant that he would give 5s. per share premium for 500 shares in the new company.

The resolution was put and carried.

Mr. C. B. Parry mentioned that he was on the mine on Saturday and Monday last, and saw exceedingly promising ore coming up from Gilpin's lode under the West Caradon Mine workings, running into Menadue, and from what he had seen he considered it to be one of the finest copper speculation in the county of Cornwall. (Cheers.)

A vote of thanks to the Chairman closed the proceedings.

WHEAL AGAR MINING COMPANY.

The ordinary meeting of shareholders was held at Mildmay Chambers, Union-court, Old Broad-street, on Wednesday,

Mr. John Weston in the chair.

Mr. Cornelius Bawden (the purser) read the notice convening the meeting. The accounts for 20 weeks, charging the costs to 31st July, showed a loss of 884*l.* 1s. 6d., which, added to the balance of 989*l.* 13s. 8d. left at the previous meeting, gave a total debit of 1873*l.* 15s. 2d.

Mr. H. Waddington remarked that 250*l.* of the amount shown was for dues, and he hoped that by paying this amount the dues would be given up altogether. Lord Robartes had been very kind to them, and seeing the heavy outlay to which the shareholders had been put he hoped that this further concession would be made to them.

Mr. Heritage suggested that in future the accounts should be circulated in anticipation of the meeting.

The Purser said this would have been done in this instance, but there had been a delay in the last sales of tin, and for one of them they only got the price that morning.

Mr. Waddington said they had 20 tons of tin on the floors now, all paid for, and only waiting to be returned, and they had all their burnt leavings still undressed. They would have to put up a little pulveriser to return these leavings, and that would complete the dressing floors. Mr. Bawden thought that if they got a pulveriser up they would return the tin and show a profit. It would, however, be better to have a call than to go on working against a dead horse.

The Purser then read the agents' report as follows:—

August 24.—The engine-shaft has been sunk to the 235, and a cross-cut north commenced to cut the lode, which we hope to reach in 4 or 5 fathoms driving. From the shaft at the 225 a cross-cut has been driven 30 fathoms north by boring machines; several branches dipping south towards Waddington's lode have been met with, which will fall into that lode at a greater depth. About 20 fathoms north a lode 5 or 6 ft. wide was intersected, which we think is a north lode of East Pool and South Wheal Crofty. We have driven about 4 fathoms west on its course on the north part of the lode, which is of a promising character, producing rich stones of tin. We hope to find a good lode as we reach the cross-course about 15 fathoms west, and as we cut the south part or footwall. The 225 is extended 24 fathoms east of cross-cut through a massive lode, which has varied in value, but will average 15*l.* per fathom. In the bottom of the 215 a winze has been sunk 5 fathoms in a well-defined and productive lode. A rise has been commenced at the 225 under this point, and when holed will lay open a valuable piece of ground for stoping, and ventilate the mine to the bottom, as well as indicate to us the best part of the lode on which to extend our levels eastward. We have two stopes working in the 215—one west worth 40*l.* per fathom, the other east worth 35*l.* per fathom; stoping at 6s. per ton of stuff. The new shaft has been completed to the 80. We are now sinking under this level, and hope to communicate with the rise from the 120 by sinking 14 fathoms. During the months of April and May numerous breakages in the plates and pumping-rods greatly interfered with our returns, and entailed additional merchants' bills much beyond our expectations. We have repaired the boilers of our pumping-engine, and added Galloway tubes to the same. A considerable outlay has been made on the dressing-floors, tin burning houses erected, and eighty frames and three buddles erected to enable us to return the tin now lying about in the waste. We calculate that we have 20 tons of tin in the slimes, burnt leavings, &c., which we are anxious to make marketable.—Edward Moyle, William Hambly.

Mr. Waddington, in reply to a question, said he believed the breakages referred to in the report were in a great measure due to the fact that the water was highly mineralised with sulphur and copper. They had now put in much stronger plates, rods, &c., which would last a lifetime. He was down on the mine on Monday, and he found that everything was working very well. The breakages delayed them a month or six weeks.

The Purser added that part of the loss shown was really on the floors, and this would be recovered sooner or later.

Mr. Waddington hoped they would cut the lode at the 235 in a month or six weeks, or in about a fortnight with the boring machine, which was now at work in the mine. They had plenty of tin in sight, and if they stopped opening any ground he believed they had tin enough in reserve to last them for 12 or 13 months. The mine was certainly looking well, and the whole of the working arrangements had been put into good order. He expected they would have a very rich bunch of tin as they extended the level west, and if they wiped out the debit balance now he hoped they would show a profit at the next meeting.

Mr. Heritage asked what the unpaid calls amounted to?—The Purser said they amounted to 399*l.* 10s. 10d., but they were all good.

On the motion of the Chairman, seconded by Mr. Heritage, the accounts were passed, and a call of 5s. per share was made, with a discount of 5 per cent. on the amounts paid on or before the 25th proximo.

Mr. Waddington said they had not sold any tin under 51*l.* per ton, and the last sale was at 56*l.* By holding the tin they had saved fully 300*l.* even on their small sales. He believed they would see tin at 60*l.* per ton before very long.

The meeting then closed with a vote of thanks to the Chairman.

WHEAL JEWELL MINING COMPANY.

A special general meeting of adventurers was held at Marazion, on Aug. 18,— Mr. F. W. Dabb, purser, in the chair.

The adventurers having first paid a visit to the mine, which is about a mile distant from the town, and had the opportunity of seeing some of the ore that is being raised from underground, the excellent quality of which afforded them considerable gratification, the notice convening the meeting was read, and the statement of account from December, 1874, to June 30, 1880, submitted. Operations appear to have been recommenced about January, the labour costs for two months to Jan. 24 being only 14*l.* 17s. 9d.; since that time they have increased to about 200*l.* per month.

The Chairman explained that in addition to the debit balance of 600*l.* 7s. 11d. brought forward from 1874, there were labour costs from the re-starting of the mine down to July 3 amounting to 910*l.* 2s.; and merchants' bills for six months, 842*l.* 13s. 2d. This latter amount, the Chairman said, appeared to be heavy, but it was explained by the fact that they had had a new boiler and fittings, and had changed the pitwork from drawing-lifts to plunger-lifts. They had also had to clear up the mine, and put the levels and shafts in perfect working order, and the expenditure for this, on timber alone, had been 151*l.* But these were special items, and therefore would not appear again in future accounts in the way of ordinary costs. At the last meeting, in January, 50 guineas were voted to Mr. Thomas Pryor for previous services as purser, and the total liabilities were 2405*l.* 13s. 1d. At their last meeting they made a call of 2s. 6d. per share on 9000 shares; they had sold 3000 relinquished shares at an average of 8s. per share, and the balance now against the adventurers was 66*l.* 17s. 4d. To meet this, however, they had a cargo of coals, which cost 87*l.* 3s., and which was not touched at the end of June—the period for which these accounts were brought up. The coals were paid for, and were, therefore, charged in the present accounts, but it might really be said that they now met with a clear book, because they had coals enough in stock to cover the small deficit which the accounts showed.

Capt. F. Gundry reported on the various points of operation, and in conclusion said: The sett is extensive, being in length about 500 fms. from east to west, and in breadth, from north to south, about 300 fms., containing five lodes throughout the said length, varying in size from 10 to 3 ft. wide. The operations at present are on the engine copper lode only. To the north of this lode there are Wheal Tommy and Old Wheal Jewell copper lodes and the tin lode. South of the engine lode there is the Bold Turn copper and tin lode. The Old Wheal Jewell lode was worked by the former parties to the depth of 55 or 60 fms., and yielded to them immense profits. They consider the prospects of the mine were never so encouraging as at present They intend sampling in about a month from this date from 40 to 50 tons of copper ore.

Mr. G. Carter, referring to the development of the mine in the future, said he claimed to have a little knowledge of that particular neighbourhood, and he knew that in many instances the district had proved a good and paying one. But during his boyhood, and also in later years, he had heard a good deal about the so-called Wheal Jewell lode, which, however, they had never yet seen anything of in the working of the mine, and his own opinion was that before they attempted to go any deeper with their engine-shaft it would be well for them to drive their levels east on the present lode and cross-cut north, in order to intersect the old Wheal Jewell lode. They were now down to the 60, and he thought that was deep enough to develope the lode, or any other lode in the sett. He, therefore, suggested that they might suspend the sinking of the shaft for the present, and he thought they would do well to act upon his recommendation, because he really attached great importance to the old Wheal Jewell lode; indeed, from what he had heard and knew of the district, he attached more importance to it than to any other lode in the mine.

Mr. Waddington remarked that the future working of the mine was, of course, a matter of the greatest interest and importance, but from what little he knew of the ground, he did not altogether agree with the views expressed by the last speaker, although that gentleman was probably better acquainted with the district than he could pretend to be. But seeing that all the water was now coming from the bottom of the shaft he thought it was only a matter of common sense that they should go down to the 70, and cut the lode at that point, especially as they were already down 3½ fms. below the 60. The lode in the bottom was of a very promising character, and he was strongly of opinion that they ought to go down to the 70, and push on those levels east with the greatest possible vigour.

Mr. Earnshaw said his own conviction was that if they worked the Wheal Jewell lode they would not do in by cross-cutting, but it would have to be done by another shaft, independent of the present one.—Mr. Carter said he held a very different opinion. He considered that they could work the side lodes from the present shaft a vast deal better than from any other.

Upon the proposition of Mr. H. G. Sharp, seconded by Mr. W. Gundry, a call of 1s. per share was made; and on the proposition of Mr. Waddington, seconded by Mr. W. Gundry, Capt. W. T. Bryant was appointed an agent of the mine at a salary of 8*l.* 8s. per month.

Mr. Earnshaw was anxious that no injustice should be done to Capt. Gundry, who, he considered, was the right man in the right place.

Mr. Waddington replied that they all valued Capt. Gundry's services, and it was not fair to suggest that it was proposed to do him any injustice. Nothing of the kind was intended; on the contrary, he would be retained at a salary with which he was perfectly satisfied. Capt. Gundry was no doubt an excellent agent, and a man whom they all respected, but it was felt that he was unable, without assistance, to attend to the underground and surface operations as well, especially if the mine was to be thoroughly and speedily developed. They proposed to retain Capt. Gundry's services, and he was quite sure it would be an economical proceeding to have a second agent.

Mr. Gundry added that the man whom they proposed to elect would not only attend to the underground work, but would also do the clerk's work at surface, and look after the plans and the dialling. These, of course, were matters that must be attended to.

Mr. Waddington, in reply to a question from Mr. Smyth, said that no opportunity would be lost of stoping away whatever ground was available for the purpose. The mine would be worked with energy, and to the very best advantage.

This concluded the ordinary business, and the meeting was next made special to consider the question of forfeiting shares on which calls had not been paid. It was decided, however, to defer this until the next meeting.

PEDN-AN-DREA MINING COMPANY.

A meeting of shareholders was held on the mine on Monday,

Mr. S. Abbot (the purser) in the chair.

The notice convening the meeting was read and the statement of accounts, showing a debit balance of 754*l.* 3s. 2d.

The Chairman explained that the last call was by the original proprietary, but everything was now handed over to the present company. They were, unfortunately, in the position of having a number of lords to deal with, and he was afraid that would entail upon them an expenditure of some 250*l.* or 300*l.* in leases. This was a misfortune, but he scarcely saw how it was to be avoided. The only lease they were at present in possession of was from Mr. Jardine, and the cost of that was charged in the accounts.—Mr. Field enquired whether all the lords could not sign one lease, and remarked that he knew an instance in which twelve lords signed one lease, and that saved a good deal of money to the adventurers.—The Chairman said he had made enquiries, but he found no disposition on the part of the lords' agents to facilitate it.

Capt. Rosewarne read the agents' report, and added that he hoped they would get to the 40 in about three months. They were now down 8 fms., and they would have been down much further if they had not been compelled to take out the old bearers at the adit and put in new ones. When the house-lift was fixed they would be able to drive the engine much faster than they had hitherto been able to do. At present the speed of the engine was limited. He considered they would be able to return the tin leavings, and to do it at a very good profit, as soon as they get the water back to Sparnon. There is no doubt about that. He believed the leavings are quite as valuable as they have been reported to be, and they think they will get the water back to Sparnon in another fortnight.

Mr. Bain then proposed that a call of 10s. per share should be made, which he believed would be sufficient to enable them to achieve the object they had in view. They desired that the undertaking should be fairly and vigorously proved, and if this were done he believed that it would redound to the benefit of the whole neighbourhood.

Mr. J. Hocking, jun., in expressing his concurrence, pointed out that the accounts showed a debit balance of 750*l.*, and Captain Rosewarne, Mr. Abbott, and himself having roughly estimated the cost for the coming four months thought it would be about 350*l.* a month, or 1500*l.* for the four months. They had incurred liabilities for the steam-capstan and other things, estimated at 500*l.*, and, as the purser had already stated, their leases were estimated to cost about 300*l.*, making altogether about 3000*l.* which they had to provide for.

The call was then agreed to, and it was also decided that the employees on the mine should choose their own doctors.

Capt. Rosewarne said that, looking at the present price of tin, at the alterations and reforms they had made in the mine, and at the saving which they had effected, he believed they would soon bring the mine into a paying state. Of his own knowledge he knew little of what was in the mine, but he had heard but one opinion expressed as to its future by the miners of the district. A great deal depended upon the economy and energy that were exercised in the management, and he had no doubt in his own mind of the ultimate success of the adventure.

The usual complimentary votes terminated the proceedings.

TRANSFER OF MINE SHARES.

An unpleasant dispute between Mr. J. M. Opie, of East Pool, and Mr. H. Waddington has arisen, in connection with the transfer of three shares in Wheal Agar, and the matter is the more annoying as the amount involved is small, and neither plaintiff nor defendant doubts the integrity of his opponent, but the case may be taken as another evidence of the necessity of making the prompt registration—within seven days, for example—compulsory in order to secure the rights of the purchaser, and of authorising sellers to demand registration or forfeiture in the event of the purchaser's neglect. It appears that Mr. Waddinton holds over 1000 Wheal Agar shares, so that three more or three less could not seriously affect him, but the action before the Vice-Warden was essential to trace were the looseness exists. Mr. Waddington bought the three shares in June, 1877, but Mr. Opie's name on the transfer appears to have been a forgery, and Mr. Opie actually paid all calls on the shares, including that made on Oct. 28, which is indisputable evidence that even if Mr. Waddington had properly purchased the shares from Mr. Opie he had left Mr. Opie saddled with all responsibility for nearly 2½ years—a most unjustifiable proceeding. Mr. Marrack appeared for Mr. Opie, and Mr. F. Hearle Cock represented Mr. Waddington, and the case was argued in a friendly way on both sides, neither plaintiff nor defendant desiring more than to have the dispute equitably adjusted.

In opening the case for the plaintiff, Mr. Marrack stated that the plaintiff continued to receive notices of meetings and calls, and to pay calls up to October, 1878, after which time they ceased, although he had not sold the shares or received notice of forfeiture. The plaintiff was a mine clerk, in the employ of the adventurers of East Pool Mine, where he had been for 15 years. He (the plaintiff) was not a person in the habit of trafficking in shares, and he would tell the names of the various mines in which he had held shares; and he would further tell them that he had never disposed of his shares in Wheal Agar. He (Mr. Marrack) would put in evidence the affidavit of Mr. Waddington, in which he (the defendant) said he purchased the three shares in Wheal Agar in July, 1877, from John Bennett, and received the transfer of the shares duly signed by the plaintiff, and subsequently handed it to Mr. T. B. Laws, the secretary of the mine. Mr. Marrack concluded by pointing out that the plaintiff had not sold his shares, as would be proved in evidence. These statements were borne out by the depositions of Mr. Opie, who swore that he first became possessed of the shares in Wheal Agar in May, 1872, and paid every call on them when made, previous to the one made in October, 1878. In that year he received a circular dated Oct. 28, from Mr. T. B. Laws, informing him that a call of 10s. per share was made on the 25th inst., and requesting the payment thereof before Nov. 12. He produced a receipt, dated Sept. 12, 1877, for the previous call. He had never received a notice of forfeiture or otherwise, than what he produced. Mr. Waddington was a large shareholder. In consequence of not receiving any notice of the meeting in Novem ber, 1879, he called upon Mr. Bawden, the clerk, and found that his three shares had been transferred to Mr. Waddington. On Dec. 8, 1879, witness wrote Mr. Waddington, asking for an explanation of the transfer of his (witness's) shares to Mr. Waddington. That gentleman replied that the shares were transferred in the usual way, and stated that the shares had been in his possession for about two years. On Dec. 11 he wrote the defendant, expressing his surprise at the transfer of the shares, stating that he never executed it, and that the signature on the transfer must have been a forgery. He denied ever having transferred the shares to Bennett, and showed that the shares were registered in the transfer book Nov. 25, 1879. He was not aware that it was the practice to keep the transfer before registering it in the books of the mine, and in cross-examination said he would swear that he never in his life gave a blank transfer signed by himself to anyone. He received notice of the resolutions that were passed at the meeting on Oct. 25, 1878, as well as notice of call.

There appears to have been considerable laxity whilst the purser-ship was in London, and Mr. C. Bawden, the recently appointed Cornish purser, deposed that all he knew about the transfer of Mr. Opie's shares was that he found an entry in the transfer ledger by Mr. Laws transferring his (Mr. Opie's) shares to Mr. Waddington, on Nov. 25 last—two days before he (witness) was appointed. None of the material facts were disputed by Mr. Waddington, who swore that he remembered being at Redruth at the latter end of June, 1877. In the evening he was at Tabi's Hotel in that town, and Capt. Nancarrow and Mr. John Bennett were present at the time. Mr. Bennett on that occasion offered him three shares in Wheal Agar, and they agreed on the price—30s. or 32s. 6d. per share, he could not tell which. Nothing was said at that time as to whose shares they were. On the following evening the transfer was given him in the same hotel by Mr. Bennett. That transfer was on a small form, and was signed and made out by Mr. Opie, and filled in by witness. He filled in his own name in the transfer, but did not sign in Mr. Bennett's presence. He signed it in London. Witness was in the habit of going to East Pool Mine, and was well acquainted with plaintiff's handwriting. Wheal Agar and East Pool were adjoining mines, and the agents of each mine were on friendly terms. He had no doubt about the signature on the transfer being that of the plaintiff. Mr. Laws was the purser at that time, and the office was in London. Immediately on his return he handed the transfer to Mr. Laws, and he believed it was duly registered at the time. He was sorry to say that a great deal of laxity was discovered in the management of the mine. He did not discover that the transfer of shares had not been registered in his name until last November, when Mr. Laws was discharged, and on visiting Mr. Laws' office, about Nov. 23 or 24, he saw the transfer on his (Laws') desk, and he expressed himself strongly to him on the matter. In cross-examination, Mr. Waddington admitted that he had no receipt or anything else to show that he had paid the three calls due on the shares previous to November, 1879. Mr. Laws had not yet handed over the whole of the books to Mr. Bawden, although he (Mr. Bawden) had been to London specially for them.

The only other evidence of importance was that of Mr. John Bennett, inn-keeper, of Redruth, who stated that on one or two occasions he had bought and sold shares for the plaintiff. He used to frequently meet Mr. Waddington at Tabb's Hotel, but he did not remember selling him any shares. He did not remember having offered any Wheal Agar shares in his life, and he would swear that to the best of his knowledge he never had a blank transfer from Mr. Opie. He remembered the fact of the shares having been sold, but by whom he did not know. The reason why he noticed it was that Mr. Waddington at that time held a large number of shares in Wheal Agar, and he wondered why he (the defendant) wished to burden himself with any more, as they were almost giving them away at the time. He was positive he had never sold the three shares in question to Mr. Waddington.

In the result the case was adjourned, that Mr. Laws might be subpœned (Mr. Waddington bearing the expense of the adjournment), and at the re-hearing on Monday, when Mr. Laws deposed that he had received a transfer from Mr. Waddington purporting to be a transfer of three shares from Opie to defendant. He did not register the transfer at the time as calls were unpaid. After holding the transfer for some time, he could not say how long, perhaps nearly two years, he drew defendant's attention to the matter. Waddington replied that they owed Opie for supplies, and witness was to debit him with the calls, and credit him 3*l.* towards the supplies. There was no credit in the merchant's ledger to Opie, nor was there any bill. Witness did it by direction of defendant, so that the shares might be registered. In the ledger the amount would not appear as paid to Opie, but under the lump sum of merchants' bills. The transfer was in the ledger which he left on the floor at the November meeting, 1879, when Bawden was appointed. Witness could not say who witnessed either Waddington's or Opie's signature, nor did he know Opie's signature.

As to the accuracy of some of Mr. Laws' statements difference of opinion will probably arise, since Mr. Opie, being recalled, swore that he never had any transaction for supplies with the mine; and Mr. Waddington, recalled, denied ever making such a statement as Mr. Laws alleged, and added that he knew Opie was not a creditor. In the face of such evidence it is not surprising that the Vice-Warden deemed it unnecessary to call upon Mr. Marrack to reply, and that Mr. Cock's address on behalf of Mr. Waddington could not secure him from an adverse decision. The learned Judge (Vice-Warden Fisher), in delivering judgment, said the plaintiff had given his evidence with great propriety, and evidently with truth. It was inconceivable that he could have forgotten that he transferred the only three shares he held in Wheal Agar. His conduct was in accord with his evidence; as soon as he found he had no notice of the meeting he immediately made inquiries respecting the matter. Mr. Waddington had given his answer straightforwardly, but having so many transactions in this mine—as he said himself, to the extent of many thousands—he might have made a mistake respecting these shares—a small number—and had been taken in by a forged transfer. It was to be regretted that when asked about the matter he answered in such an intemperate manner. The Vice-Warden went very minutely through the evidence, and came to the conclusion that the plaintiff never executed any transfer of the shares. Judgment must consequently be for the plantiff, with costs.

Gold Mining Extraordinary.—The Nova Scotia papers give some striking particulars of the prosperity of the Rose Gold Mining Company. In the beginning of the present month the product of 14 men's labour during six weeks was a brick of gold weighing 800 ozs. 5 dwts. 5 grs. The brick is worth over $16,000, and is as remarkable for its purity as for its size. It is one of the characteristics of the Rose Gold Mine that the deeper the mine is worked the richer the quartz is found to have become, while the gold also correspondingly improves in purity. The last quartz came in from a depth of 160 ft., and is the richest yet obtained. The first bar taken from the mine gave a return of $19·34 to the ounce, and the results kept on improving until the product of the last crushing was sold for $19·98 and the present brick will, doubtless, realise over $20 to the ounce. The net profits to the company, as the result of the present crushing, will be over $14,500, a result never before equalled in the world in quartz gold mining in any regular well-defined lode. "Pockets" have been found in a few rare cases where richer results have been obtained for short periods, but nothing to equal this as the result of steady quartz mining.

The Coal Trade.—The report of the directors of the Lofthouse Colliery (Limited), to be submitted to the half-yearly meeting on the 28th inst., contains a statement signed by the Mayor of Leeds (Ald. Tatham), chairman of the directors, in which he says: Those who have observed the reports of the markets during the first six months of the present year will have been able to satisfy themselves that the coal trade was never in a more depressed condition. Our own experience has been not even quite so favourable as that of the previous half-year, very little more coal having been drawn, and a lower rate realised; and until some improvement takes place in the trade we hardly expect to be able to present to the shareholders more satisfactory results. Under these circumstances it is no cause for surprise that the colliery cannot do more than pay its way, including expenses of interest, depreciation, repairs, and all other legitimate charges, and that we have been able to do this is cause for some degree of satisfaction. The directors greatly regret their inability to declare a dividend; they feel this as much as anyone, a large portion of the concern—3091 shares, averaging 618 each—being held by themselves. Under the circumstances they forego their claim for fees for the half-year. The directors consider that the proprietors have a sound and valuable concern, requiring only a return of brighter days in the coal trade, when they hope that the patience of the shareholders and of themselves will eventually be amply repaid. The directors consider that the colliery is worked on the best and most economical and efficient principles. The report of Mr. Hall, the engineer and manager, states that during the half-year 71,980 tons of coal have been drawn, being 1732 tons more than the former half-year. The colliery worked 106¾ days, giving an average quantity of 674 tons per day, against 118½ days, and a tonnage of 592 tons, for the previous half-year. The first three months of the half-year the pit worked 61 days, drawing 39,054 tons, averaging 640 tons per day; whilst the last three months the pit worked only 45¾ days, with a total of 32,926 tons, averaging 719 tons per day. The large throws met with in the south winnings are gradually getting less going east, and from present explorations in this direction they seem to be running out altogether. The coal lying to the east of the shafts is rising very much, varying from 3 to 7 in. per yard, although the coal is of good quality and thickness. The coal in the other parts of the mine is also of good quality. The bottom part of the seam is tender, and makes more small than is desirable. To meet this evil the coal is worked end way, which produces a larger percentage of round than if worked board way. The whole of the plant and machinery have been kept in efficient condition during the half-year, the repairs of which have been charged to revenue account. The general stores, too, have been entered at the lowest market values. The latter part of the half-year the coal has been very difficult to dispose of, and at unsatisfactory prices.

Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. CLXI.

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UNDERGROUND VENTILATING FURNACES.

The use of ventilating furnaces underground was almost universal in England until 10 or 15 years ago, but is now giving place in most large collieries to the employment of mechanical means. The change in favour of mechanical ventilation took place much earlier in Belgium and France, whilst in Germany the general introduction of fans seems to have taken place at the same time as in this country. As the requirements for powerful ventilation became evident the use of one of the shafts as a very high chimney for producing a draught seems to have been a most natural idea, and that the deeper the shaft the greater the current which could be produced.

In Lecture 158 it is stated that the amount of ventilation is proportional 1° to the square root of the depth of the shaft, and 2° to the square root of the difference of temperature at the surface and underground. From 1° it becomes then evident that the amount of ventilation which can be passed through a mine is greatest in the case of deep mines, and in the case of mines respectively 150, 200, 250, 300, and 500 yards deep, the amount of ventilation—or, more properly speaking, ventilating power—is as 12·2, 14·1, 15·8, 18·7, and 22·3. This fact is of considerable importance in comparing the relative advantages of furnace and mechanical ventilation. From 2° we shall find that the increase in temperature of the upcast current is far from causing an increase in the velocity, and consequently in the amount, of the air current proportional to the amount of coal burnt in the furnace.

Let us suppose that the air enters the mine at a temperature of 10° C, and in passing through the workings is raised to 20° C before entering the furnace, and that its temperature is raised in the furnace to 30°, 40°, 50°, 60°, and 100° C respectively. The difference in temperature of the intake and return air currents is 20°, 30°, 40° 50° and 90° respectively. According to 2° the amounts and velocities are then respectively as the square roots of 26, 30, 40, 50, and 90; or 4·5, 5·5, 6·3, 7·1, and 9·5. Strictly speaking 2° is not quite correct, the velocity, as is shown elsewhere, being proportional to the square root of the quotient obtained by dividing the difference in temperature by 1 plus 0·00365 times the temperature of the descending current. Hence the amounts and velocities expressed more correctly are as 4·3, 5·2, 5·9, 6·5, and 8·2 respectively. The amount of coal consumed is, however, proportional to the product of the amount of air passing over the furnace by the increase of temperature, and therefore as 4·3×10, 5·2×20, 5·9×30, 6·5×40, and 8·2×80; or as 40, 104, 177, 260, and 656.

An examination of the above figures will show that the increase in the amount of ventilation takes place much more slowly than the increase in the consumption of coal. Take, for example, the cases where the temperature is raised from 30° C and 100° C—an increase due to the furnace of 10° C, and 80° C respectively. The amount of ventilation is as 4·5 to 9·5, a little more than doubled; whilst the amount of coal consumed is as 43 to 656, or more than 15 times as great. On this account it does not seem advisable to raise the temperature to more than 40° C to 50° C; although in many English collieries this temperature is regularly exceeded. A temperature of from 40° to 50° will allow of the shaft being used for winding for the ascent and descent of the miners, and for pumping, a greater heat will render these inconvenient, if not dangerous. Although the above appears the advisable limit, the practical limit offered by the furnace is more generally that which determines the increase in temperature. A furnace with a given area of fire-grate cannot burn above a given quantity of coal per hour, since although the burning of a greater amount of fuel produces a greater current it requires itself a greater draught for combustion.

Considerable importance is attached to the manner in which the furnace is fed with air. The most economical in regard to the amount of coal consumed, and the amount of ventilation produced, is to pass the whole of the return air current through the furnace. The current may be made to pass partly over, and partly under, and then through the furnace bars, or it may be made to pass wholly over or wholly under the furnace. By many persons this is held to be the best mode of furnace ventilation, on the ground that with it the greatest possible amount of ventilation can be obtained, and that it should be held as a rule that the return air currents ought never to contain so much gas as to make it dangerous.

In many other cases only a portion of the return air current is passed through the furnace, the temperature of this portion being raised so high that when it is mixed with the remainder of the return current the common temperature is sufficiently high. In this case the air which passes through the current is only allowed to do so by entering beneath the fire-bars, the front of the furnace being generally closed by doors. When several seams are worked from one pair of shafts the furnace should be placed in the bottom of the shaft, and the whole of the ventilation from the lower seam passed through the furnace. Advantage is often taken in this second case to lead those portions of the ventilation direct to the furnace which are the least likely to contain fire-damp, whilst those containing fire-damp are led separately to the shaft.

Lastly, the furnace may be fed entirely by fresh air. This is now almost universal in mines giving off much fire-damp, where mechanical ventilation is not adopted. In some of the collieries on the Continent, where the two shafts are situated at some considerable distance apart, this method is not so easy of adoption. The return air current is generally led to the upcast shaft, by the means of an inclined drift, which enters the shaft at a point sufficiently high above the furnace that there is no liability of any sparks or flames reaching the return current. The amount of fresh air which should pass to the furnace is generally regulated by means of sliding doors. This last method has the disadvantage that a portion of fresh air is withdrawn from the ventilating current, lessening considerably the amount which passes through the workings, and which would add to the diluting power of the current, and in many cases would be sufficient to render harmless the return current. This method is, therefore, held by many persons to be unadvisable, and as somewhat deceptive in the advantages it offers, as the extra ventilation would lessen the risk of having an explosive mixture in the returns, with the only advantage of rendering it impossible that it might be fired at one point—the furnace. By such persons the view is laid down as fundamental that the return current never ought, even in the case of mechanical ventilation, to contain sufficient fire-damp to render it dangerous.

The furnace is but very rarely placed directly in the bottom of the shaft, generally at a distance of from 10 to 40 yards sideways from the shaft, being connected with the shaft by a slightly inclined drift. By this latter arrangement the bottom part of the shaft can be used for hanging-on, it being supposed that the furnace drift enters the shaft at a height of 10 to 20 yards above the shaft bottom. It also allows of the upcast shaft being used as a pumping shaft, and the bottom for the sump, though this arrangement is not generally advisable. The furnace drift should be so long that there is no liability of sparks entering the shaft. From 15 to 30 yards appears usual for the length of the furnace drift. In some collieries, where the furnace is placed at the bottom of the shaft, it is placed within an inner shaft or cylinder of brickwork, built up to a height of 30 to 30 yards. Fresh air is led direct to the furnace, and the return air current passes up in the annular space between the shafts, lessening the liability of the heat from the furnace setting fire to the coal in the immediate neighbourhood of the furnace.

Where steam is generated underground for the purpose of underground haulage, the boiler fires are used to promote the ventilation. Those portions of the levels and shaft surrounding or in the immediate neighbourhood of a furnace should be well bricked, to prevent the rock from being cracked and loosened by the heat, and also in the case of coal mines of the setting on fire of the coals. The furnace is generally built independently from the brick lining of the level or drift in which the furnace is placed. In the simplest case the furnace is constructed by building two side walls from 6 to 9 ft. apart. These are carried up vertically to a height of 3 to 4 ft., the back of the furnace—that portion next the shaft—has a cross wall carried up to about the same height as the side walls. The fire bars are laid about 6 in. below the top of the side walls, the top of the furnace being covered in by a semi-circular arch. There is thus a space left all round between the brickwork of the furnace and the lining of the drift. In this space a constant current will be passing to the shaft, and tends to keep the brickwork lining of the drift cool. At the Hetton Colliery the furnace is constructed by building two vertical side walls, 18 in. thick, to a height of 8 ft.: these are surmounted by a cylindrical brick arch, with 3 ft. rise in the centre, the arch likewise being built 18 in. thick. The fire-bars are placed between the two side walls at a height of 3 ft. to 3 ft. 6 in. The back of the furnace is built up to a height of about 18 in. above the fire-bars. This causes any air which passes beneath the bars to rise up through the bars. At a distance of 3 ft. from each of the side walls two other 9-in. walls are built, about 7 ft. in height, and a semi-circular arch is built between and connecting each 9-in. walls with the walls of the furnace, Access is, therefore, had to all parts of the furnace, and the space between the side walls allows of a strong current passing on both sides of the brickwork of the furnace, which are cooled thereby, and any liability of the coal becoming ignited is greatly lessened.

The length of each separate furnace is generally 6 ft. or 9 ft., so that area varies between 40 and 60 square feet. The most usual size of furnace is 6 ft. wide by 8 ft. long, which is capable of passing from 40,000 to 50,000 cubic feet of air per minute, with a consumption of about 40 cwts. per 24 hours. In large collieries, where fire-damp is met with, it is necessary to have a much larger grate area, which is accomplished by arranging or combining two or more furnaces. One arrangement, very common in England, where two levels enter the shaft (about half the ventilation passing along one level, and the other half along the second level) is to place a furnace in each drift. When this is the case the drifts should not enter the shaft opposite, but at right angles to each other. This arrangement has the disadvantage that the furnaces are at some distance apart. A much better mode is to combine several furnaces together. At Sherburn Colliery two furnaces are placed back to back, the air current passing sideways over the furnaces, and not in the direction of the length. At the old Hetton Colliery four furnaces 6 ft. by 6 ft. are placed side by side, giving a total area of 150 square feet. The air current passes sideways over the furnaces; the charging-doors are all on one side. The air current is caused to traverse well towards the walls of the furnace by a wall partition or tongue built against the entrance to the furnace. This furnace is said to pass 220,000 cubic feet of air per minute. At Houghton-le-Spring Colliery four furnaces are combined together, giving an area of 144 square feet. Two furnaces nearest the shaft are placed back to back, the air passing sideways as at the Sherburn Colliery. Close to these two others are placed side by side with a partition wall, the air passing lengthways over these two, and immediately afterwards sideways over the other two. The chief disadvantage of the arrangement is that the charging of the complete furnace, which is rectangular in plan, takes place on three different sides. The front of the furnace above the fire-bars is usually arranged so that it can be partially or totally closed by swing or slide doors, thus causing the air to enter beneath through the bars, which are thus kept cool and preserved much longer, although a greater heat in the furnace is thereby obtained.

GOLD MINE WORKINGS IN SOUTH AMERICA.

BY GEORGE ATTWOOD, F.G.S., ASSOC. M. INST. C.E.

The Chile Vein Gold Mine, referred to in the present paper,* belongs to the Potosi Mining Company, and is situated in the State of Guayana, in Venezuela, in latitude 7° 11′ north, and longitude 61° 58′ west. The outcrop is at an elevation of 1044 ft. above tide level. The Chile Vein is a true fissure vein found in the diabase rocks (a greenstone), and averages in thickness a little more than 4 ft. The gangue is nearly pure quartz, and the gold in it is in a native state, more or less mixed with sulphides of iron, copper, lead, &c. The outcrop of the vein was first found, and this has been followed down to about 250 ft. below the surface. The yield of gold from the upper portions of the vein was about 1 oz. to the ton of 2000 lbs., whilst the lower workings have yielded between 5 and 6 ozs. per ton. In sinking a shaft alluvial soil is found to a depth of 10 to 12 ft.; this is succeeded by the bed rock, called by the natives "cascajo," and is about 150 ft. in thickness, and then by the country rock, a hard and tough diabase. The alluvial as well as bed rock are weathered and altered diabase.

The chief opening to the mine is a shaft 12 ft. by 7 ft., divided into two compartments, and carefully timbered. One compartment is used exclusively for hoisting, the other contains the pump and ladder way. The shaft was carried down vertically until the vein had been penetrated and the footwall found, when the vein was followed at its angle of about 55°. The vein is mined much easier than the diabase, so the vertical shaft was abandoned after the vein was cut. The winding and pumping plant is driven by a high-pressure horizontal engine, having a cylinder 15 in. in diameter, supplied with steam by a Lancashire tubular boiler of 50-horse power. All machinery used in the district must be constructed on the most simple plan, and of the best material, owing, first, to the great lack of skilled labour, and, secondly, to the great cost of freight from the Orinoco river to the mine. A not unusual charge for carrying machinery, &c., from the Orinoco to the mine is 6d. per pound; this is due to the inferior character of the roads. The mine is drained by a Cornish plunger pump of 8 in. bore. The ore and waste are hoisted up to the adit level 80 ft. below the surface, and are then tipped into a large hopper, from which the railway trucks are fed.

Negroes from the West India Islands are employed as miners; they drill single handed, and at the same time do a good day's work. Sexagon ⅞-in. steel drills are used, and hammer heads of 5 to 6 lbs. each, with handles about 1 ft. in length. The average depth of the holes bored is 26 in. One man drills about 46 in. deep daily. To throw 1 ton of ore (2000 lbs.) 60½ in. of drilling are required. The charge for a 26-in. hole is 3 to 4 ozs. of dynamite. The men are paid $1·08 pesos=3s. 4d. per lineal foot for drilling. Underground foremen charge and fire the blasts, and watchmen are employed night and day to examine the ore after the blasts have been fired; also to select and lock up any rich specimens of gold quartz which may have been exposed by the explosion:

The ore is carried from the mine to the reduction works on a short line of railway, ths entire length of which is 9136 ft. from the mine entrance to the crushing mill; the gauge is 30 in. The rails used are 30 ft. long, and weigh 30 lbs. per yard. The sleepers were cut from small trees of hard wood which grow in the vicinity; the best are made from the bullet and "purple heart" trees. The rails are held together by small fish plates, and they are kept in position by being spiked down to sleepers placed from 2 to 2½ ft. apart. From the mine entrance to the works the difference in level is 215 ft., making an average gradient of 1 in 42, or 124 ft. to 1 mile Many parts of the line have a gradient exceeding 1 in 20, or over 264 ft. in 1 mile.

The first locomotive employed was one of Chaplin's small construction engines, with vertical boilers and cylinders, having four wheels, and of 8 nominal horse power. Sufficient power could not be obtained from this, as the native hard woods, of which the beds and framework of the trucks were made, are extremely heavy. A new 12-horse power locomotive was, therefore, constructed, having six wheels, and carrying an end water tank. Ore trucks were built to hold 5000 lbs., but the usual weight carried was 4500 lbs.; they were fitted with hand brakes made at the mine. The brakes are so constructed that they can be shipped or unshipped at pleasure, and the brakeman can readily block the hind wheels of the truck even on the steepest part of the line by a single motion. When the trucks are run into the adit level of the mine the brake handle is allowed to fall back, so that it does not interfere with the timbers or any obstructions which it would otherwise be liable to encounter.

Mining timbers, machinery, boards, supplies, &c., are carried from the reduction works to the mine, and the gold ore is brought down by the line of railway. The scarcity of water near the mine necessitated the carriage of the ore to a convenient spot, where water could be obtained in sufficient quantity to separate the gold from its matrix; besides, the nature of the soil was such that after heavy rain the roads for weeks were impassible for loaded wagons. The best and largest supply of timber is also found near the crushing mill, and a saw mill, using a 4 ft. circular saw, driven by a Ransome and Sims' portable 12-horse power double cylinder engine, has been employed to cut timbers, boards, railway sleepers, &c.

Four trucks, containing about 9 tons of ore, are generally brought down at one time, and when close to the mill they are emptied as near as possible to the Blake rock crusher; this crusher has an opening of 10 in. by 14 in.; it is driven by a shaft connected with the saw mill engine. The quartz is then broken up to pieces of about 2 in. square. The crushing mill has 20 stamp heads of the following weight:—Stem, 320 lbs.; tappet, 70 lbs.; head, 163 lbs.; shoe, 126 lbs.; total, 679 lbs. The stamps are driven at the rate of 60 blows per minute, and revolve automatically about 15 revolutions per minute. About 1½-horse power is required to work each stamp. The battery box or mortar is made in one casting of the best homogeneous iron. A good mortar weighs 3800 lbs. Below the line of discharge copper plates, ¼ in. in diameter, are bolted to the front and back of the mortar. An iron sieve, 1 ft. in depth and 4 ft. in length, is placed in front, and is kept in position by being firmly wedged with wooden keys into a grooved part of the casting. Two copper plates, which are placed in a recess in the mortar, are used to collect all the gold that can be saved in the battery boxes by such means.

The sieves or screens are either constructed of the best iron wire, 1600 holes to the square inch, or of punched steel plates with similar sized holes. The batteries are supplied with water from a pipe 3 in. in diameter under a head of 20 ft. For each mortar of 5 stamp heads four ¾-in. water pipes are employed to enable the amalgamator to distribute the water supply evenly over the stamp heads.

Ore containing much ferruginous clay requires a greater amount of water for crushing than ore composed of nearly pure quartz; one gallon, or 10 lbs., of water per minute for each stamp is the average quantity required for stamping. When poor gold ores are treated the size of the sieving used is not so fine as the above mentioned, and about 1200 holes to the square inch are sufficient.

The crushed ore slides over a series of copper plates, each 3¾ ft. wide by 12½ ft. long, placed at an inclination of 1 in 15. The ore is then allowed to run into an inclined trough, called a "tye," from which it passes through the arrastras or grinders, and after having been ground in the above, through a gravity concentrator, from thence it is conveyed down the river.

Before crushing gold ores the copper plates for collecting the gold must be galvanised by giving them a thorough coating of mercury. The copper plate is washed clean, scrubbed with a hard brush, and afterwards scoured with a little fine sand. A weak solution of nitric acid is then used to procure a perfectly clean surface of copper. The first coating of mercury is applied to the plate from a solution of nitrate of mercury, prepared by the amalgamator in the following manner:—Mercury is dissolved in a weak solution of nitric acid; a gentle heat only is necessary, or the solution is accomplished cold by leaving the mercury in a basin covered with nitric acid for 12 to 24 hours, and by occasionally stirring it with a glass rod or a wooden stick. Care is taken to have no free acid; the better plan is to allow the nitrate of mercury to crystallise, and afterwards to redissolve the crystals in water. The solution of nitrate of mercury is then poured carefully over the cleansed surface of the copper plate, and the plate is galvanised instantaneously, provided the surface has been thoroughly prepared. Additional metallic mercury is now added and rubbed over the plate until it presents a mirror-like appearance. The advantages of having copper plates well galvanised are great. The loss of gold is much diminished by keeping them clean and free from tallow, oil, &c., also from any substance which prevents the plates being brought into contact with the small particles of finely-divided gold that are carried over their surface by the water.

The copper plates having been thoroughly galvanised are kept clean when partially covered with metallic sulphides or clayey matter by rubbing them with a piece of cyanide of potassium, enclosed in a small piece of canvas or chamois leather. The copper plates inside the mortars, as well as those on the trays, having been galvanised and put in place, the stamps are set working, and after they have made 60 blows about 4 ozs. of mercury must be added to the contents of the mortar. When the stamps have been running for an hour the amalgamator watches the appearance of the galvanised copper plates near the point of discharge of the mortar. Should the mercury on the plate be fluid, and in places run over the surface in fine globules, too much has been put in the mortar. Fresh mercury is always added every three to four hours, according to the richness of the ore. If the gold amalgam collected on the copper plate near the battery discharge feels hard and dry, the ore requires more mercury. By this simple method of observation a careful reduction officer will obtain all the gold in the ore that can be extracted by the battery and copper plate amalgamation. By the above method the average amount of gold obtained inside the battery box is about 60 per cent. of the total saved.

Gold in oxidised ores can frequently be saved by battery amalgamation and copper plates, with "riffles" or "stops" in the troughs, but when sulphides are met with the returns from the above method are unsatisfactory, and in some cases a loss of 80 per cent. of gold is incurred. Oxidised ores associated with gold are only found in gold mines near the surface. Precautions have, therefore, to be taken in the construction of gold reduction works—first, to save the coarser particles of free gold; secondly, to save minute particles mechanically mixed with pyrites, &c. After the water level is reached on gold veins or reefs sulphides nearly always predominate, and the amalgamation becomes more complicated.

[*To be continued in next week's Journal.*]

BLASTING POWDER IN MINES.—Major Majendie, the Chief Inspector of Explosives, in writing to Mr. Joseph Toyn, the secretary of the Cleveland ironstone miners, with regard to the explosion of gunpowder by a blow, says—"There is ample testimony to the fact that powder may be exploded by a blow with comparative ease, the fact being that the temperature at which gunpowder explodes (about 540° to 560° Fahr.) is readily reached by percussion or friction, if the powder be so placed that there is no absorbtion of the energy by the cushioning of the blow, and this temperature is also a long way within that at which heat becomes visible. Copper tools may be made to give out sparks. I have had much experience of this in some experiments which I made. The great thing for young men to avoid (whatever tools they use—even with wood) is the exercise of force beyond what is absolutely necessary."

DETERIORATION OF GUNPOWDER.—The changes which take place in gunpowder after a certain lapse of time, and which have been noticed to have been so great as to cause a decrease in the velocity of the ball according to the age of the cartridge, have been found by M. Pothier to be due to chemical decomposition, due in all probability to the presence of metallic substances, such as copper and zinc. M. Pothier placed a certain quantity of powder, the analysis of which had been carefully made, in contact with copper, zinc, iron, tin, and lead, and after the lapse of a stated interval made a fresh analysis. New products had been formed, containing salts of the metals experimented with, together with sulphate of potash. It was found that zinc had the greatest power of affecting the powder, and particularly if damp; next came copper, iron, tin, and lead had less effect.

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* Transactions of Civil Engineers. The communication was accompanied by several drawings.

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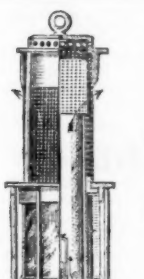

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On Nov. 20, 1879, Capt. A. Francis says—"When the mine has been brought into a thorough and efficient state of working over the deep adit, and regular returns and profits made, the drainage of this water will be attended to, and the 20 fm. level pressed eastward through ore ground developed and now developing in the deep adit level, and a section of from 2000 to 3000 fms. of rich ore ground be made speedily available, and also farther the 30 fm. level would follow in the same course when thought desirable." He also estimates "that when this work is accomplished a profit of £4000 per year can be made."

Feb. 23.—In his report he estimates "that when the 20 fm. level under the deep adit has been driven through the ore ground it will lay open £30,000 worth of ore, and that the 30 when pressed forward will yield additional ore ground to the extent of £20,000."

Mr. William Nance, of Cornwall, and now of North Shields, who has had an extensive experience in managing mines in most parts of Europe, reports—"Nov. 27, 1879: The water-wheel now in course of construction is of sufficient power to work all the machinery required for several years, and drain and sink the mine to a much greater depth; so that the only further outlay to drain the mine to the bottom will be a run of rods from the engine-shaft to the wheel, and 30 fms. of pitwork, which will not cost more than £250, and considering there is every probability of commencing to raise ore from this shaft as soon as it is drained, and that the levels can be immediately extended under the course of ore gone down in the bottom of the deep adit, I should recommend this to be done as soon as possible, and a small air-compressor connected with the same wheel for driving a boring machine in the deep adit and 30 fm. levels, which, being driven by water-power, would enable you to drive the ground four times faster and 25 per cent. cheaper than by hand-labour; and I have no doubt if this is carried out the mine will soon be in a position to make handsome profits, and the capital required for the whole plant will not exceed £2500."

Capt. A. Williams, March 17, 1880, reports—"The engine-shaft has been sunk 20 fathoms below deep adit level, and a cross-cut driven northwards into the lode, and a communication made from the 20 up to the Baltic workings on the course of the lode though an excellent course of silver-lead ore. This level should be pressed on with all possible dispatch, as you have a run of ore ground ahead of it for about 120 fms. in length, and a back of 20 fms. to stope away up to the sole of the deep adit; but the engine-shaft has been continued to the 30 fm. level—thus giving 30 fms. back for 120 fms. long; and as I know by experience that the ore increases in depth I consider it quite safe to value it at 30 cwts. per fathom, and 120 fms. long by 30 high gives 3600 fms. at 30 cwts. per fathom, equals 5400 tons—say at the lowest price this ore sold at, £12 10s. per ton, equals £67,500. This block of ground should give two-thirds profit; but, to make safe, say one-half to be clear profit, £33,750."

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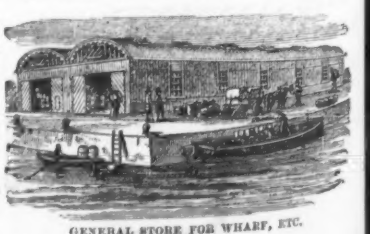

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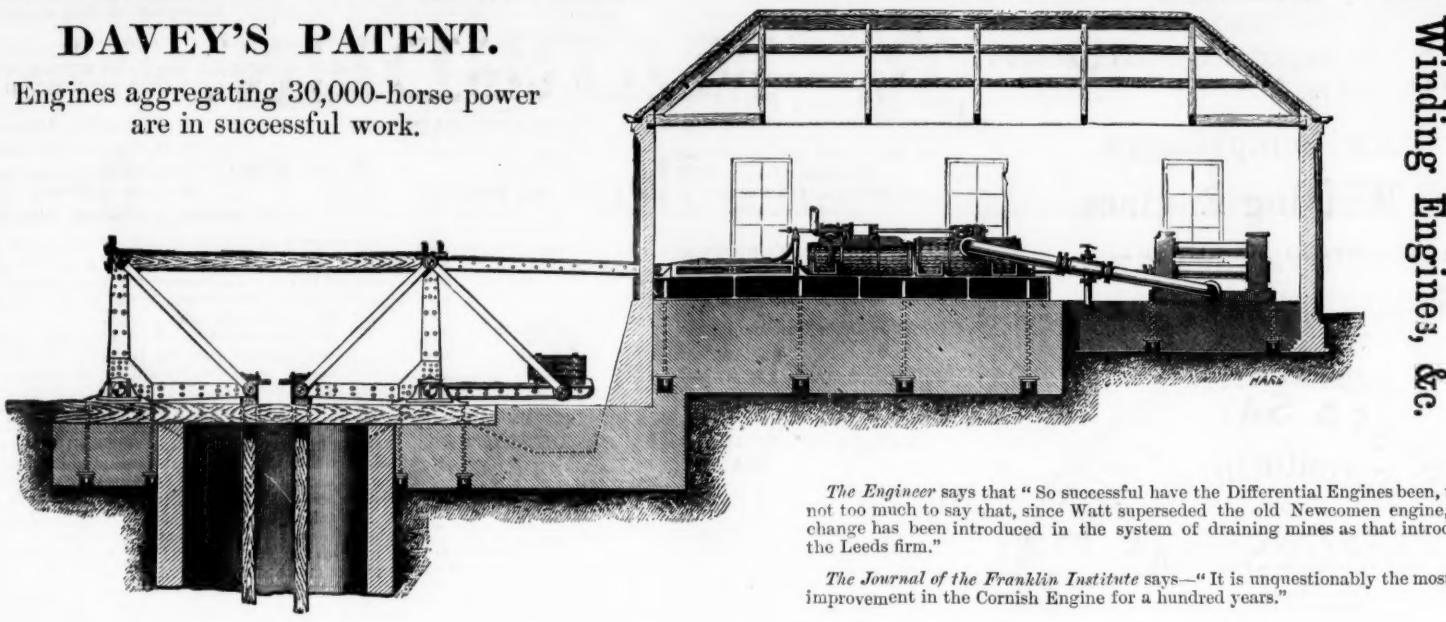

The Engineer says that "So successful have the Differential Engines been, that it is not too much to say that, since Watt superseded the old Newcomen engine, no such change has been introduced in the system of draining mines as that introduced by the Leeds firm."

The Journal of the Franklin Institute says—"It is unquestionably the most marked improvement in the Cornish Engine for a hundred years."

CATALOGUES ON APPLICATION.

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FOR MINING AND QUARRYING PURPOSES.

PRICES ON APPLICATION

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Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper

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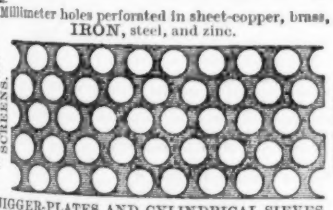

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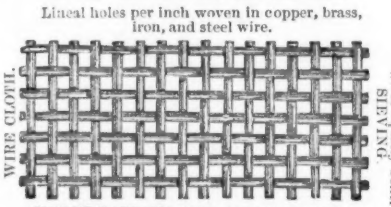

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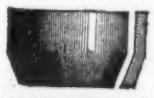

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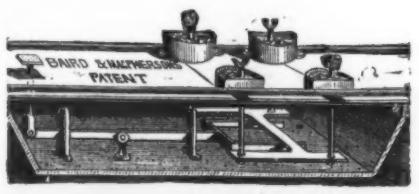

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This Wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth, or even less if required. It is easily coupled to a steam-engine, and in this way always assists it by whatever amount of power the water is capable of giving, and therefore saves so much fuel.

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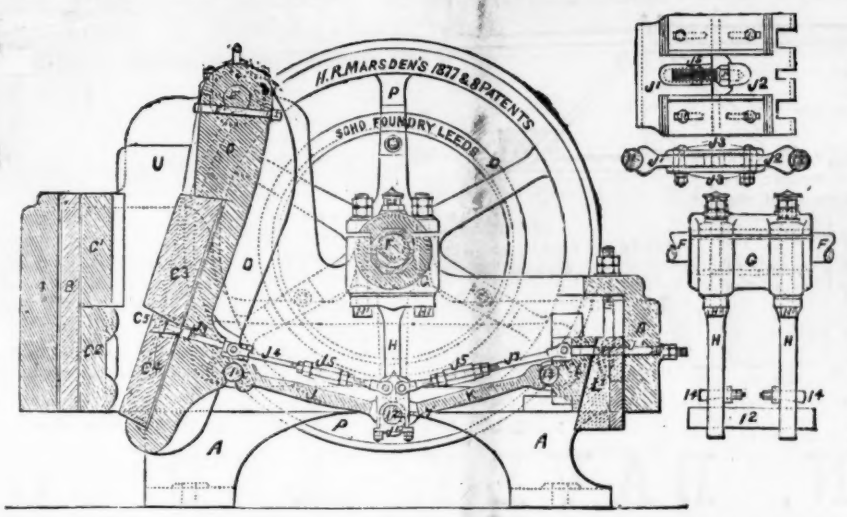

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St. John del Rey Mining Company (Limited).

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Blake's Stone Breaker.—Statement made by the Managing Director of the St. John del Rey Mining Company, Mr. John Hockin, with regard to six months' practical working of Blake's Stone Breaker, affording facility for judging of the relative economy of machine and hand labour in this kind of work, and also of the cost of getting the Stone Breaker to work in difficult places. The price paid to Mr. Marsden for the machine referred to by Mr. Hockin was £180, and adding to this the cost of engine, carriage, and fixing, the aggregate cost to the company of the Breaker in working order was £500. By this outlay the company is enabled to dispense with the labour of 55 people, the value of which is £600 per annum. The cost of working the machine could not be more than the wages of about five men (the machine requires but one man to feed it, so that the rest would be for engineer, fuel, oil, &c.), and allowing for interest on outlay and for renewals when necessary, the saving must be enormous.—*Mining Journal.*

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CATALOGUES, TESTIMONIALS, &c.

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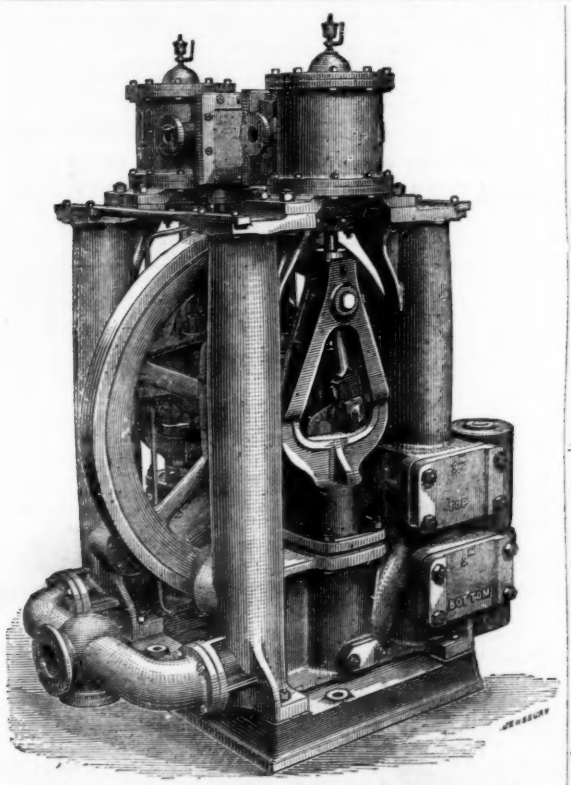

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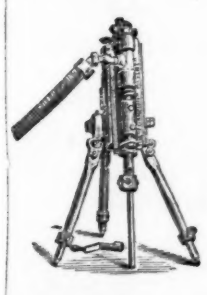

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